THIRTY-FIRST ANNUAL REPORT

OF THE

State Department of Health

OF

NEW YORK

For the Year Ending December 31, 1910

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THIRTY-FIRST ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

STATE OF NEW YORK,

EXECUTIVE CHAMBER,

ALBANY, *March* 2, 1911.

To the Legislature:

I have the honor to transmit herewith the thirty-first annual report of the State Department of Health.

(Signed) JOHN A. DIX

NEW YORK STATE DEPARTMENT OF HEALTH

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EUGENE H. PORTER, M.A., M.D.

Division of Administration

Deputy Commissioner	William A. Howe, M.D.
Secretary	Alec H. Seymour

Division of Sanitary Engineering

Chief Engineer	Theodore Horton, C.E.
Principal Assistant Engineer	H. B. Cleveland, C.E.
Special Assistant Engineer	Prof. H. N. Ogden, C.E.
Assistant Sanitary Engineer	C. A. Holmquist, C.E.
Assistant Engineer	A. O. True, C.E.

Division of Laboratory Work

Director of State Laboratories	William S. Magill, M.D.
Chief Sanitary Chemist	L. M. Wachter
Water Analyst	L. R. Milford
Assistant Water Analyst	W. S. Davis
Bacteriologist	William A. Bing, M.D.
Director Cancer Laboratory	H. R. Gaylord, M.D.
Director of Bender Laboratory	Thomas Ordway, M.D.

Division of Vital Statistics

Director	F. D. Beagle

Division of Communicable Diseases

Director	William B. May, M.D.

Division of Publicity and Education

Director	Hills Cole, M.D.
Director of Tuberculosis Exhibition	Edward G. Whipple, M.D.

Consulting Staff

Dermatologist	Frederic C. Curtis, M.D.
Ophthalmologist	Herbert D. Schenck, M.D.
Orthopedist	Harlan P. Cole, M.D.
Laryngologist	John B. Garrison, M.D.
Statistician	Prof. Walter F. Willcox, Ph.D.

Tuberculosis Advisory Board

Edward R. Baldwin, M.D	Saranac Lake
Thomas Darlington, M.D	New York City
Livingston Farrand, M.D	New York city
Hon. Homer Folks, Esq	New York city
Alfred Meyer, M.D	New York city
Prof. Veranus A. Moore, M.D	Utica
John H. Pryor, M.D	Buffalo
William H. Watson, M.D	Utica
John L. Heffron, M.D	Syracuse

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*Smallpox experts.
†Lecturers and consultants on oral hygiene.
‡Also health officers.

THIRTY-FIRST ANNUAL REPORT OF THE STATE DEPARTMENT OF HEALTH, 1910

To Hon. JOHN A. DIX, *Governor of the State of New York, Albany, N. Y.:*

SIR:— I have the honor to present herewith the thirty-first annual report of the State Department of Health, for the year 1910:

PUBLIC HEALTH WORK AND THE WELFARE OF THE STATE

It cannot be doubted that the citizens of this State have at last aroused themselves to the vital importance of public health work and to a full realization of its possibilities. The educational efforts of the Department, supplemented by local health officers and public-spirited citizens, have awakened a keen interest in sanitary matters and aroused a public sentiment heartily in favor of health reforms. It is realized that public health work is practical and that the State must play its part in its conduct and support. Where a few years ago hospital facilities were denied those afflicted with tuberculosis, today seventeen counties have built, or will soon construct, county hospitals. The demand now is that epidemics of contagious disease shall be *prevented,* not stamped out after they have assumed alarming proportions. The social welfare of the State requires that the functions that should properly be exercised by the State government in the prevention of disease and the education of the masses in sanitary matters shall be fully carried out.

This change of the attitude of the public is of recent development and signifies the abandonment of old ideas and a new conception of things. Now that contagious diseases may be prevented, it is asked, why should not this be done? If it is possible, as Pasteur asserted, for the "world to rid itself of all contagious diseases" a stricken community rises up to know what progress we are making. Smallpox can be effectually checked by vaccination. Then why not enforce it? Typhoid can be largely eradicated by proper hygienic measures. Why not establish

them? Tuberculosis is preventable. An aroused State is determined to see this deadly menace to health properly controlled. Diphtheria, formerly the scourge of childhood, can be effectually checked by the use of antitoxin. Should the State exercise as much care and spend as much money to save the lives of children as it does to prevent diseases in cattle? These and many other questions of similar import we are soon to be called upon to answer. We must wage war against these enemies of our State. A new civilization demands it. New York should not be behind in so significant a movement as this.

The increasing demands upon the Department show that the people believe in its efforts and that they are in thorough sympathy with the fight for better sanitary conditions, more freedom from disease and a stronger administration by the State in health affairs. Proper education of the people in health matters, efficient work by health authorities, and the co-operation of public officials generally in the efforts for better housing and laboring conditions, proper water supplies, parks and playing grounds, and the other improvements that we know every municipality should have, will eventually produce a condition which will fully justify our pride in our citizenship.

The Conservation of Life in New York State

From an economic standpoint alone, it is entirely possible to save millions of dollars and thousands of lives to the State. Governmental agencies for the protection of the public health have only begun the work in the vast field which they are destined to eventually occupy. The average value of a life lost by preventable disease has been estimated at $1,700. It is possible to reduce our death rate by proper preventive measures and at this valuation it would be necessary to save less than one hundred lives annually to equal the entire appropriation of $150,000 to the Department of Health. From a business standpoint, how can a better investment be made? — our mortality reduced, diseases prevented, untold suffering and sickness eliminated, and a better and happier State in which to live. Are not these things worthy of our attention, appealing alike to humanitarian, economist, citizen and the stranger within our gates?

Our greatest natural resource is the child. In the field of the prevention of infant mortality alone, the State could well afford to spend more money than it now gives for our work and thereby build a larger, healthier and better commonwealth for the future. All the potential possibilities of the future of our State are in the children of to-day. Would anyone argue that in providing so far as lies in our power for a healthier race, the State is exceeding its functions?

The Public Health Laws

Our health law is in many respects inadequate. Much of it was enacted thirty years ago and is far behind the demands of to-day, and has not kept abreast of our progress. While not advocating a large increase in the powers of the State Department of Health, it cannot be doubted that there should be sufficient authority vested to improve many improper conditions, especially where local authorities neglect or refuse to perform their duty. The Department now has very little direct power. It can investigate but it lacks authority to enforce necessary changes. Our efforts to secure proper legislation in the past have met with but little success. I desire to point out that unless we can make the proper changes in our statutes strengthening the authority of he Health Department where needed, the State of New York will not occupy the position in health work which it should. It should be clearly pointed out that rapid progress is being made in other States and that our situation will soon be a reproach to us unless we move more rapidly. I, therefore, earnestly request that the Legislature seriously consider my previous recommendations covering this matter.

Appropriations

For a number of years the very limited appropriations for the work of this Department have been pointed out. The amount of money expended by the State for public health work is insignificant when compared with many other lines of activity. Those who are most interested in this subject cannot but feel that it has not received the attention that it should.

It is realized that the demands on the State government far exceed the income, and for this reason the Department is asking

for very few new items, and only such as are absolutely necessary to make its work efficient.

Our fund for the investigation and control of communicable diseases is $7,500. There should be a sufficient amount appropriated to enable the Department to exercise a wider control and make more thorough and careful investigations of epidemics.

The demands on the Department for other investigations and for assistance from municipalities require an increase in our fund for general investigations.

The facilities of our antitoxin laboratory are too limited, the buildings are overcrowded, residents of the city of Albany complain of its location, and the manufacture of antitoxin which requires the keeping of a considerable number of horses, should not be conducted where the laboratory is now situated but should be moved outside of the city. The State owns the property and it has increased in value. A farm should be purchased outside of the city, where the antitoxin work should be moved at once, and where eventually the State should build and equip a State Laboratory adequate for its needs.

Tuberculosis

The success attained in our educational efforts with this disease has been very marked. The Department's large traveling tuberculosis exhibition which has been shown in most of the cities of the State, has been continued and for the season 1910–11 its itinerary is as follows:

Saratoga	Little Falls	Batavia
Plattsburgh	Gloversville	Hornell
Malone	Johnstown	Oneonta
Ogdensburg	Ithaca	Hudson
Watertown		

The attendance has been large. The interest which has been aroused is very apparent and no single educational effort on the part of the Department has met with as much enthusiasm. In addition to this joint campaign and pursuing the plan of co-operation with the State Charities Aid Association which has been conducted in the past, the Department has also sent out six smaller

exhibits for the conduct of county campaigns. The increased demands for hospital facilities for tuberculosis patients is owing largely to the educational work which has been done and the establishment of county hospitals, laboratories, dispensaries and other efforts to combat this disease are all in large part owing to the work that has been pursued.

Hearings on Tuberculosis Hospitals

Under the amendment to the Public Health Law of 1909, requiring the approval of the State Department of Health and the local health officer for the establishment of a hospital for tuberculosis, ten applications were filed upon which hearings were held, and during the past year nine applications were submitted. These were as follows:

The Independent Order of Brith Abraham, of Liberty, filed an application for permission to establish a tuberculosis hospital in the town of Liberty, Sullivan county, and hearing was held on March 11th. The desired permission was denied April 7th, 1910.

The Independent Order of Foresters filed an application for permission to establish a tuberculosis hospital in the town of Brighton, Franklin county. The hearing was held at Albany, May 5th, and the application granted the same day.

Application was filed by the Utica Tuberculosis Camp Committee of the State Charities Aid Association for permission to establish a tuberculosis hospital in the town of New Hartford, Oneida county, but was withdrawn.

Application was also filed by the Metropolitan Life Insurance Company for permission to establish a tuberculosis hospital in the town of Somers, Westchester county, and hearing was held in White Plains May 6th and adjourned to May 20th, and the application was withdrawn. A new application was filed by this company for permission to establish a tuberculosis hospital in the town of Moreau, Saratoga county. The hearing was held at Albany, December 2nd, and application granted December 21st, 1910.

The county of Schenectady filed an application for permission to establish a tuberculosis hospital in the town of Glenville, Sche-

nectady county, and hearing was held in Albany, August 18th. The application was granted September 16th, 1910.

Jefferson county filed an application for permission to establish a tuberculosis hospital in the town of Wilna, Jefferson county. Hearing was held at Watertown, September 12th, and the application granted September 23rd, 1910.

The Red Cross Committee of Newburgh filed an application for permission to establish a camp for the treatment of tuberculosis in the town of New Windsor, Orange county, but the application was withdrawn.

The Tupper Lake Sanatorium Company filed an application for permission to establish a tuberculosis hospital in the town of Altamont, Franklin county, and hearing was held at Tupper Lake, November 28th. The application was granted December 6th, 1910.

The application of the Metropolitan Life Insurance Company is noteworthy as showing a determination on the part of a large corporation to care for its employees afflicted with this disease.

The increased hospital provision not only provides the means of cure, but removes the danger of infection from the home and workshop and is one of the first great steps in the solution of this problem. I wish to call attention to my recommendation of last year in regard to needed amendment to the statute requiring my approval of sites for these hospitals.

For the Future

Every effort should be exerted to see that our municipalities provide hospital facilities and that these institutions are properly conducted. The law requires the State Department of Health to approve plans for county tuberculosis hospitals and these will be required to be constructed on modern lines. Special attention should be paid to the tuberculosis law, complete registration of cases should be insisted upon, and localities that have not as yet seen fit to appropriate funds for its enforcement should be shown its importance. We can proceed in this work with the absolute confidence that in a comparatively short space of time the results will be so apparent that they will fully justify our expectations.

Cancer Laboratory

The increase each year in the deaths from cancer, despite the fact that the death rate from many other diseases is decreasing, furnishes the saddest chapter in medicine to-day. The establishment of a cancer laboratory by the State some years ago marked a point in our civilization and its research work has been devoted to determining the causes and methods of control of this great affliction.

It is greatly to the credit of the State that this laboratory has been maintained, but the point has now been reached where provision should be made for a hospital in connection with the laboratory. The proposed plan for such an institution provides for conveying to the State the valuable land and laboratory building at present used by the State, and furnished for such use through the generosity of Mrs. William H. Gratwick of Buffalo, N. Y., and constructing necessary buildings for such a hospital, which shall be under the control of a board of trustees.

It is to be hoped that the State will not fail to avail itself of this opportunity and that this next great step may be taken without delay.

Oral Hygiene

Proper hygiene care of the teeth is being rapidly recognized as one of the most important adjuncts to good health. A good dental equipment, which means good teeth and a clean mouth, is one of the best physical assets which a person can possess, and materially contributes to his health and happiness.

As in most matters pertaining to the conservation of the health of the people, this special line of preventive medicine finds its greatest possibilities for effective work among the millions of school children of the State. It is proposed as far as time and funds at our disposal will permit, to conduct a campaign of education throughout the State, by means of illustrated lectures, largely among the children of our schools. These lectures will be prepared by two of the most eminent dentists in the State, who have recently been appointed lecturers and consultants to the State Department of Health. Arrangements will then be made to illustrate these lectures and to utilize them for educational purposes throughout the State.

DEPARTMENT DIVISIONS

Division of Sanitary Engineering

The nature and scope of the duties which a properly equipped division of engineering should be ready to perform was briefly outlined in my annual report for 1905. At that time it could hardly have been considered as organized, although the nature of the work which would devolve upon it had in a measure been correctly foreseen. It remained, therefore, largely a matter of time and experience as to the rapidity with which this newly created division would have to be developed in order to meet the demands upon it.

The history of this division has from its beginning been one of rapid and progressive development. An awakening public interest in matters relating to public and personal hygiene, a realization of the importance and necessity for changes in the sanitary conditions and customs of public and private living, have resulted in demands for advice and assistance which have constantly taxed our resources to the limit.

A high standard of efficiency of an engineering organization of this nature in what may still be considered a comparatively new field of practical science, and with a public eager to take advantage of all of the resources which may be legitimately demanded of it, can only be accomplished by a constant adjustment of its engineering force and facilities to these increasing demands. The work and duties of an engineering division cannot stop with or be restricted to merely the duties prescribed by the Public Health Law. If the Department stopped here the health work of the State would surely retrograde. There is now an aroused interest in health work among the citizens of this State, brought about largely through a stimulus resulting from an educational campaign and an accession or response to voluntary appeals for advice or assistance.

If, then, the work of this important division is to be continued efficiently, progressively and with combined facilities and resources to satisfy a justly aroused public sentiment toward better sanitary living, it must be accomplished on the one hand by a continued careful study and continued readjustment of the forces and resources of the engineering staff to the work to be performed.

The work of the engineering division for 1910 holds the record for what has been accomplished by it since its organization some five years ago. This will be briefly described under general headings adopted in my previous annual reports, as follows:

Protection of Public Water Supplies

The protection of public water supplies will probably always head the list of important duties devolving upon the Sanitary Engineering Division since a pure supply of water has always been accepted among sanitarians as one of the greatest conservers of public health. Indeed, the record of past epidemics of disease traceable to infected water supplies has lost none of its force in the present day in causing the public to realize that whatever else is lacking in the way of municipal cleanliness, a clean and unpolluted water supply should be procured and maintained at almost any cost.

Unfortunately the lay mind does not dwell as often or as conscientiously as it should upon these grave questions and for this reason it becomes incumbent upon the State Department of Health, in addition to the regular duties required of it under the Public Health Law, to perform also a large amount of voluntary work in this field.

These activities may, in general, be classified under the headings of

(a) Protection of public water supplies subject to rules and regulations enacted by the State Commissioner of Health.

(b) Protection of public water supplies not subject to any such rules and regulations.

The work for 1910 under these two headings will now be briefly described.

(a) Protection of water supplies protected by rules and regulations.

Perhaps the most important provision of the Public Health Law relating to water supplies is the enactment by the State Commissioner of Health of rules and regulations for the protection from contamination of public water supplies when application has been duly made by the proper authorities having control of these supplies, and during 1910 applications were received and rules and

regulations prepared for enactment in the cases of the following municipalities:

East Syracuse	Deansboro	Cooperstown
Delhi	Cortland	West Haverstraw
West Carthage		

These applications were received in the latter part of the year, and since it is necessary in each case to carefully inspect the watersheds, and customary to submit drafts of these rules for consideration and comment of local authorities, these rules and regulations were at the close of the year enacted only in the cases of East Syracuse and West Haverstraw, the remaining ones being at this time in the hands of the local authorities for consideration.

Attention was called in my last report to the lack of clear understanding on the part of many water boards and companies as to the methods of procedure to follow in removing violations under these rules and regulations, and to the responsibility both legally and financially in causing these rules to be rigidly complied with. It was also pointed out that, owing to these responsibilities and especially the burden of expense entailed by the enforcement of rules, there appeared to be some hesitation on the part of many municipalities and water companies in enforcing the rules and regulations, and, further, a reluctance on the part of many municipalities where their supplies were not protected by rules but the sanitary quality of which was unquestionably subject to suspicion to apply for enactment of these rules.

Realizing this hesitancy on the part of local authorities to meet their full responsibility in this matter, and with a purpose of counteracting to some degree at least this undesirable, and at times dangerous, consequence, a special investigation was made of the watersheds of a considerable number of public supplies which were protected by rules and regulations. These inspections proved clearly that the fears entertained regarding the enforcement of rules and regulations were in a measure well founded; for in a number of cases violations were found to exist on the watershed and in a few cases the conditions revealed a shocking disregard of the moral and legal responsibility which undoubtedly rests upon water boards and water companies.

The municipalities, the watersheds of which were inspected during this investigation, are as follows:

Avon and Geneseo	Elmira	Oneonta
Canastota	Fredonia	Ossining
Chester	Illion	Penn Yan
Cobleskill	Little Falls	Pleasantville
Cold Spring	Livonia	Port Jervis
Corinth	Mechanicville	Rome
Cornwall-on-the-Hudson	Monticello	Sherburne
	Middletown	Tarrytown
Coxsackie	Middleville	Troy
Dolgeville	Newburgh	West Point
Elmira (State Reformatory)	Norwich	Walton
	Nyack	Waverly

It is not to be inferred that any considerable number of water boards and companies are delinquent in maintaining a proper sanitary patrol over the watersheds of their supplies. On the contrary, the water supplies of this State which are protected by rules are mostly very carefully and conscientiously patrolled and the boards and companies are very prompt in reporting any violations of these rules and regulations to the State Department of Health, as required of them by law. These cases are always promptly inspected for verification following which the customary notices are issued and action by the State or local authorities in accordance with the procedure required by these rules is taken.

During the year 1910, violations of water rules were voluntarily reported to this Department, examined into, and necessary orders to local boards of health issued in connection with the water supplies of the following municipalities:

Auburn	New Rochelle	Utica
Kingston	New York City	Yonkers
Mt. Vernon	Saugerties	

(b) *Protection of Water Supplies not Protected by Rules and Regulations*

By far the larger proportion of public water supplies in the State are not protected by rules and regulations enacted by the State Department of Health. Many of these are, however, very

efficiently patrolled, but at the same time it has been found that a considerable number of them receive practically no regular or even occasional inspection for the purpose of ascertaining and removing sources of pollution.

There may be a number of reasons to account for the relatively few public water supplies in the State that are protected by water rules and undoubtedly the question of expense of abatement is, as pointed out above, a very important, if not the principal one. At any rate it has been found that the number of such supplies improperly patrolled is a serious question, one which might well deserve the consideration of some change in the laws relating to the control of waters of the State used for water supply. In order, however, that the dangerous conditions which do exist in connection with many of them may be brought more forcibly to the attention of the local authorities responsible, as well as to the people themselves, the special investigation of these unprotected supplies, begun in 1908 and extended during 1909, was continued during the present year.

It is noteworthy to find that many more applications were made by municipalities in the State for these examinations and reports during 1910 than in either of the two preceding years, which can only be accounted for by a more general knowledge throughout the State of the activities and successful results accomplished by the Department through these investigations in improving the condition of many supplies not protected by rules. A list of the municipalities where such investigations were made during 1910, and where reports setting forth the findings and recommendations were duly transmitted to the local authorities, is as follows:

East Worcester
Fonda
Glens Falls
Kingston
Lyons
North Tarrytown
Oxford (Woman's Relief Corps Home)
Round Lake
Rouses Point
Seneca Falls
Sonyea
Whitehall

In addition to the special investigations outlined above, considerable work of the Engineering Division has been devoted to examinations into, and reports upon, special features or problems which have arisen in connection with water supplies not protected by rules and regulations. These have usually been in

response to particular requests and in these cases field examinations have usually been made and advice freely given.

Municipalities where examinations into special problems or features have been asked for during 1910 and where advice has been furnished, are as follows:

Belmont	Delhi	Niagara Falls
Blauvelt (State Rifle Range)	Dobbs Ferry	Ogdensburg
Cold Spring	Letchworth Village	Skaneateles
Corning	Monticello	Waterloo

Typhoid Fever Investigations

Although typhoid fever through the State during 1910 was on the average less prevalent than for the past decade or semi-decade, it appears that the number of outbreaks or cases of undue prevalence of this disease in cities and villages were nevertheless more numerous. In most, but not all, of these cases the Department was appealed to for aid in searching out the sources of infection and in giving recommendations for remedial measures.

Since the sources of infection responsible for such outbreaks are in general most frequently found in conditions associated with infected water supplies, infected foods and insanitary conditions of living or premises, and involve frequently many questions of a strictly engineering nature associated with water supplies and sewage disposal, this epidemiological work devolved largely upon the Sanitary Engineering Division. In every instance a careful study was made of the infected territory and a searching investigation made to determine the source of infection. This investigation work was not always simple but was nevertheless ultimately successful, for the sources of infection were discovered and measures promptly recommended to suppress them.

The list of places where the prevalence or epidemics of typhoid fever were thus investigated and reported upon by the Engineering Division during 1910, is as follows:

Hobart	Syracuse	Willard State Hospital
Long Lake and Webb (towns)	Syracuse (State Institution for Feeble-Minded Children)	Yonkers
Moravia		
Quarryville		
Rouses Point		

Sewerage and Sewage Disposal

If the streams of this State used as sources of water supplies are to be protected against the dangers of sewage contamination, and if the remaining ones are to be maintained in a satisfactory degree of cleanliness, it is essential that some adequate control over the discharge of sewage into these waters be vested in the central authority of the State, having jurisdiction broader than those possessed by local authorities which if left to decide these questions might be swayed by local interest or prejudice. Such control is in part granted the State Commissioner of Health under certain sections of the Public Health Law, which provides that all plans for systems of sewerage and sewage disposal of municipalities must first be submitted to and approved by him, before they may be constructed or put in operation; and that in all such cases the Commissioner shall stipulate the conditions under which sewage and wastes from these factories or sewer systems may be discharged.

Under these sections of the Public Health Law, which have been in effect since 1903, the date of the passage of the act, there is required of the Engineering Division the larger part of its routine work, comprising the examination of plans for original systems of sewerage and sewage disposal and of extensions or modifications thereof, and the preparation of permits containing the conditions as to degree and extent of purification required and to the location and manner of discharge of the effluent from the sewage disposal works.

During 1910 plans for sewerage or sewage disposal works were examined, reported upon and approved in the cases of the following municipalities:

Auburn
Auburn (State Prison)
Binghamton
Blauvelt (New York State Rifle Range)
Bronxville
Bronxville and Tuckahoe
Chappaqua (Convalescents' Home of New York City Children's Aid Society)
Clarence (T.) (Buffalo Auto Club)
Clifton Springs (Clifton Springs Sanitarium)
Comstock (Great Meadow Prison)

Dannemora (Clinton Prison)
Depew
Elka Park (T. Hunter)
Fulton
Fultonville
Hastings-on-Hudson
Hempstead
Ilion
Johnstown
Lestershire
Letchworth Village
Long Beach
Medina
Monroe County Tuberculosis Hospital.
Monticello
New Rochelle
North Tonawanda
Ogdensburg
Oneonta
Oswego
Pelham
Pelham (T.)
Poughkeepsie
Rochester
Rockaway Beach
Rome
Sonyea (Craig Colony for Epileptics)
Spring Valley (Salvation Army Orphanage)
Stamford
Ticonderoga
Tuckahoe
Utica
Watertown
Westfield
Yorkville

The following is a list of places where permits were issued during 1910 for the discharge of wastes from factories and individual properties into streams of the State under suitable restrictions:

Brasher Falls
Chautauqua Lake (11 permits issued)
Clarkstown (T.)
Downsville
Earlville
Gilbertsville
Harford Mills
Hermon
Java (T.)
Pittsford (T.)
Poughkeepsie
Rensselaer
Scriba Center
Shaverton
Sherburne (T.)
Wolcott

In addition to the routine of examining and reporting upon plans for sewerage systems and extensions, time-consuming as this work must necessarily be, there is still much work of an educational and advisory nature to be done in connection with it. This educational work is considerable in amount and varied in its nature, and includes numerous conferences with local boards or committees, lectures and talks in connection with sewerage systems and sewage disposal plants, and advice and reports concerning specific local problems. The municipalities where work of

this nature has been performed by the Engineering Division during 1910, are as follows:

Akron
Central Islip (State Hospital)
Cheektowaga
Cornwall-on-Hudson
East Syracuse
Geneva
Glen Cove
Hamburg
Hastings-on-Hudson
Lancaster
Long Beach
Martville
Morristown
Newark
New Paltz
Nyack
Phelps
Port Jefferson
Ravena
Ray Brook
Riverhead
Rome
Theresa
Victor
Warwick
Yonkers
Yorktown Heights

Investigations of Stream Pollution

If there is any one subject or topic, excepting perhaps that of tuberculosis, over which the people of this State have become thoroughly aroused during the past few years, it is the pollution and defilement of our streams. It is a subject which cannot be discussed too frequently, nor can its importance be too often impressed. Much has been done within recent years, it is true, not only in curtailing but actually eliminating some of the wanton defilement which has up to this time been permitted with many of the streams of our State. A vast amount of work still remains to be done, however, before these streams have been reclaimed to a degree of cleanliness which public decency demands.

It is indeed fortunate that the people of this State have through the educational campaign which has been waged during the past five years, been awakened to a sense of appreciation on the one hand of the healthfulness and comforts derived from preserving our streams in a state of natural purity, and on the other hand of the dangers and annoyance in allowing them to become defiled with sewage pollution.

Difficult as a crusade must be against these practices of sewage pollution, and made more difficult by the lack of adequate laws to enforce its removal, it must be continued energetically until these streams, once pure, have been reclaimed to a reasonable degree of purity. The work of the Department in this field devolves necessarily upon this Division, which is called upon almost daily to in-

vestigate and report upon complaints of nuisances arising from stream pollution in different sections of the State.

These nuisances are usually of a public nature, frequently far-reaching in their effect and not infrequently require considerable time to thoroughly investigate and report.

The municipalities where the more important of these nuisances have arisen and received the attention of the Department are the following:

Allegheny River	Greenfield Center	Plattekill
Amenia	Greenwood Lake	Plattsburg
Andes (T.)	Harriman	Prattsville
Andover	Hunter	Plymouth
Augur Lake	Huron	Rensselaer
Babylon	Islip	Scarsdale
Banksville	Jamestown	Scriba Center
Bath	Lake Placid	Sharon Springs
Bethel	Lakewood	Skaneateles
Big Moose	LaSalle	Smithtown
Binghamton	Malone	Spring Valley
Brant Lake	Margaretville	Stony Point
Bronx River	Mt. Pleasant	Tonawanda
Camillus	North Pelham	Victor
Chateaugay	Oneida	Warren
Chautauqua Lake	Oneonta	Warwick
Cortland	Oxford	Waterloo
Esperance	Patchogue	Wilton
Fairport	Perinton	Windham
Findley Lake	Phelps	Wolcott
Fishkill-on-Hudson	Philmont	Yonkers
Franklin	Phoenicia	
Gowanda	Piermont	

Public Nuisances Not Arising from Stream Pollution

Although the pollution of streams is, generally speaking, responsible for the larger number of what may be considered serious nuisances, there are on the other hand a great many nuisances arising from other sources which must be investigated. Many of them are of minor importance, many are of a more private

than public nature, and most of them are directly or indirectly cases of appeal from the action, or more often inaction, of the local board of health.

Frequently these cases can be satisfactorily dealt with through correspondence and the assistance of the local board of health or its representative, the local health officer. These local boards have full jurisdiction to deal with nearly all nuisances in this class and it seems to be generally overlooked or ignored that nearly all of these cases should be dealt with by the local boards and not referred to this Department. When referred to the Department, however, these complaints are always investigated and if sustained are either referred to the local board of health for action if the case falls within its jurisdiction or authority, or they are taken up indirectly by the Department with the party complained of through the local board of health if the case falls partly outside its jurisdiction.

The municipalities of the State where the more important of these nuisances have arisen and have been referred to this Department for investigation and action during 1910, are as follows:

Akin	Coxsackie	Hudson Falls
Albion	E. Syracuse	Huntington
Athens	Euclid	Hyde Park
Aurelius	Fair Haven	Islip
Aurora	Fayette	Jordan
Baldwinsville	Fayetteville	Lewiston
Ballston	Fishkill Landing	Lyndonville
Batavia	Franklinville	Malone
Brocton	Freeport	Mamaroneck
Brooklyn	Friendship	Marcellus
Callicoon	Fulton	Matteawan
Canaseraga	Geneva	Milford
Cato	Greece	Montour Falls
Catskill	Greenport	Mt. View
Cheektowaga	Harrison	Newburgh
Clarks Mills	Hensonville	New City
Clarksville	Hermon	Newfane
Clifton	Highland Falls	New Rochelle
Cohoes	Hornell	Niskayuna

North Salem	Rockland Lake	Syracuse
Oneonta	Rome	Tarrytown
Oriskany	Rosendale	Troy
Ossining	Schenectady	Tuckahoe
Peekskill	Schuylerville	Tupper Lake
Penn Yan	Seneca Falls	Varick
Port Chester	Sharon Springs	Vestal
Port Henry	Sheridan	Walton
Port Jervis	Silver Springs	Watervliet
Red Hook	South Nyack	Wheatfield
Rensselaer	Somers Center	Whitehall
Rhinebeck	Stillwater	Yonkers
Ripley	Stony Ridge	

Investigations by Order of the Governor

Section 6 of article I of the Public Health Law provides that whenever required by the Governor of the State the Commissioner shall have the power and shall make an examination into nuisances or questions affecting the security of life and health in any locality of the State. Although, strictly, no executive orders were issued under this provision of the law, two investigations and reports were made at the request of the Chief Executive, one in relation to the prevalence of typhoid fever in the State and one in reference to the reconstruction of the Bird Island pier outfall sewer in city of Buffalo.

The first of these investigations and reports was requested by Governor White during the month of October, and since at this season of the year typhoid fever is normally most prevalent this investigation afforded an opportunity of emphasizing the fact well understood by sanitarians but not by the public at large, that there is normally a very marked seasonal variation in the prevalence of typhoid fever during the year. That this fact is not generally understood or appreciated was evident from the apparent feeling of anxiety entertained by the public and freely circulated through the press that typhoid fever was unduly prevalent throughout the State, and in certain localities or municipalities this feeling reached a state of real alarm. The results of this investigation showed very clearly, however, that through the State

as a whole, typhoid fever during 1910 was some 10 per cent. less prevalent than the average for the ten-year period immediately preceding, notwithstanding that in some districts of the State its prevalence was in excess of the normal. Incidentally the results also illustrate the false anxiety or alarm frequently evidenced by the public concerning a strictly scientific matter when important facts and a knowledge of the subject are lacking.

Special Investigations

If real and continued progress is to be made in public health work through the officers of a State Department of Health, it is essential that the work be not limited to merely the requirements and duties imposed by the Public Health Laws. Important as these duties may be under the law, and efficient as the work of the Department may be in carrying them out, there is a considerable amount of work of an educational character that must be performed in order to make the public understand and appreciate the rationality or the necessity of the enforcement of these laws. Furthermore, there is a considerable amount of information concerning statistics of health and sanitary conditions in different localities of the State which must be considered a prerequisite to suitable and appropriate action by the Department in many matters pertaining more especially to water supply and sewage disposal. This information can only be secured through special work and investigations outside of the routine or regular duties imposed by the Public Health Law.

It is hardly practicable in this brief report to describe fully the many investigations of a special nature, or to give detailed account of the different educational activities, devolving upon the Engineering Division under this heading. The more important of these, however, may be considered the special investigations of the sanitary conditions of summer resorts, sanitary conditions of cities and villages, sanitary conditions of State institutions reporting to the Fiscal Supervisor of State Charities, illegal construction of sewers and violations of permits issued for the discharge of sewage, and the work of preparation of the engineering exhibit for the State fair.

The work in all these branches is a continuation and develop-

ment of the work instituted and carried on during previous years and, except in the case of the State Fair Exhibit, has in a large measure been fully described in my previous annual reports. A brief outline, however, will be given of the work during 1910 under the headings and in the order above referred to.

(1) *Sanitary Conditions of Summer Resorts*

The work of inspecting the sanitary condition of summer resorts, first commenced by this Department in 1906, has been extended each year since that time. During the season of 1910 three inspectors were engaged almost continuously on this work for a period of three months.

The work accomplished in 1910 includes the reinspection of 259 resorts previously inspected, to the proprietors of which resorts letters had been addressed requesting that improvements in sanitary arrangements at their resorts be made, together with original inspections of some 170 additional resorts not previously inspected, a total of 429 resorts, many of them accommodating several hundred guests, having been visited and inspected by representatives of the Department.

As noted in my report of last year, the State has been divided into thirteen districts in order to systematize the investigation and to facilitate the work of inspection. These districts are as follows:

1. Thousand Islands — St. Lawrence district.
2. Fulton Chain — Big Moose district.
3. Raquette, Tupper and Long Lake district.
4. Saranac — St. Regis district.
5. Lake Champlain district.
6. Lake George district.
7. Lake Pleasant — Saratoga Springs district.
8. Western district.
9. Central — Finger lakes district.
10. Otsego Lake — Richfield Springs district.
11. Catskill — Albany district.
12. Southern district.
13. Long Island district.

The work of reinspection in 1910 of the 259 resorts referred to

above was carried on in districts 2, 3, 4, 9, 11 and 12. Original inspections were made of resorts in districts 1, 3, 4, 5, 11 and 12. With the completion of these inspections the Department now has full information concerning the sanitary condition of practically all of the summer resorts in these districts having guest capacities of twenty-five or more persons.

As has been my custom in the past, it is my intention to give publicity in the Department's Monthly Bulletin or the press to those resorts where the proprietors, after repeated notices from this Department, have failed to make the improvements recommended to safeguard the health of their guests.

In this connection it may be stated that many requests are received during the summer season from prospective summer visitors, for information relative to the sanitary condition at hotels and summer resorts which they are planning to visit. From the records of recent inspection of summer resorts on file in the Department, it has been possible to answer many of these inquiries and it is expected that eventually complete records will be available at this Department of the sanitary condition of all summer resorts in the State.

(2) *Investigation of Sanitary Conditions of Cities and Villages*

These investigations and studies of the sanitary conditions of certain cities and villages in the State were begun some three years ago with the object, primarily, of determining what municipalities were apparently experiencing or suffering an unduly high rate of mortality from communicable diseases and, secondarily, of determining the causes and influences responsible for these high rates in order that they may be removed and the mortality rates lowered. These investigations have covered a considerable number of the cities and villages of the State, have proved of inestimable value to the respective localities, and have in most cases resulted in the undertaking of extensive improvements which will unquestionably lead to a lessening of death rates from infectious diseases in these places.

Since these investigations have in previous years covered the more important places where improvement seemed potential, leaving thus a smaller number of places for consideration, and

owing to the necessity for important lines of investigation in other directions, there were investigated during 1910 the sanitary conditions of only three municipalities, namely Lockport, Kingston and Oneonta. These investigations were started late in the year and although only the field inspections and studies have been made at the close of the year it is expected that the reports will be completed at an early date.

(3) *Illegal Sewer Construction and Violations of Sewer Permits*

The handicap placed upon an effective campaign against illegal practices in sewer construction and the discharge of sewage into the waters of the State resulting from a lack of adequate powers granted the Commissioner of Health for the enforcement of certain sections of the Public Health Law, and of the failure of the passage of bills amending this law, has however not lessened the efforts of the Department in this direction. This campaign, if such it may be called, has been carried on along two general lines; first a special investigation to determine as to what municipalities were constructing sewers without the approval of the Department or were violating any of the conditions of any permit issued for discharge of sewage into streams; and secondly, the holding of conferences with local authorities when violations of the law occurred to enlist their co-operation and compliance with the provisions of these statutes.

Unfortunately there are many cities and villages still openly violating the Public Health Law in regard to both the construction of sewers and the discharge of sewage from them into the waters of the State. The large number of these cases and the serious conditions of pollution of some of our streams incident to them, makes the matter an important one, so much so that it was referred to the Attorney-General a year ago for his opinion as to the scope and powers of the Health Commissioner under Article V of the Public Health Law with reference to sewerage and sewage discharge, and to his authority in dealing with municipalities which persisted in violating the law.

This decision had not been rendered at the time my last report was transmitted but was received early in 1910. The decision is a very important one and disappointing in so far as it defines clearly

the narrow limitation of authority and powers of the Health Commissioner in enforcement of the provisions of Article V and the relatively greater authority and power of local boards of health in correcting and removing violations of these provisions. Incidentally, it emphasized the pressing need for a complete revision of these sections of the Public Health Law.

As stated above, however, the efforts of the Department have not been relaxed in this direction, nor will they be, notwithstanding the present number of continued violations of the law and the greater difficulties resulting from the recent decision of the Attorney-General. It should be stated, however, and with no little credit to the people and local authorities in the State, that throughout our work in this direction there has been generally shown a spirit of co-operation in this movement to correct abuses of stream pollution and to comply with the provisions of the Public Health Law.

(4) *Engineering Exhibit at State Fair*

Perhaps nothing can better or more graphically illustrate the character and diversity of the work of the Engineering Division than the display of maps, records and models exhibited as part of the Department's general exhibit at the State Fair at Syracuse; and for this reason and because a considerable amount of work was devoted to the preparation and arrangement of these engineering records and models, mention should be made of it.

This exhibit was essentially an educational one and comprised largely a wall display of plans, charts, profiles, photographs and other graphical illustrations representing the work of the division in connection with public water supplies, sewerage and stream pollution; and a series of working models, in operation, representing various methods and types of sewage purification works. Interest centered largely around these working models, and in connection with the operation of them a member of the engineering staff was detailed to give brief descriptive talks upon their constructive and operating features.

It may be well to mention in connection with these models that they were made from actual detailed plans, requiring consider-

able time in their construction, and that so far as known they represent the first working models of sewage purification works that have ever been exhibited, at least in this country.

(5) *Investigation of State Institutions Reporting to Fiscal Supervisor of State Charities*

At the last session of the Legislature, section 14 of the Public Health Law was amended by chapter 92 of the Laws of 1910, to provide for examinations and reports on the sanitary condition of such institutions as report to the Fiscal Supervisor of State Charities whenever requested by him, and for regular analyses of water supplies of these institutions. A request was accordingly received from the Fiscal Supervisor on May 18, 1910, for examinations and reports of all of these institutions, and since that date the work of inspection has been in progress jointly by the Divisions of Engineering and Laboratory Work. There are seventeen of these State institutions, as follows:

Western House of Refuge for Women, Albion.
New York State School for the Blind, Batavia.
New York State Soldiers and Sailors' Home, Bath.
New York State Reformatory for Women, Bedford.
New York State Reformatory, Elmira.
New York State Training School for Girls, Hudson.
Agricultural and Industrial School, Industry.
Thomas Indian School, Iroquois.
Eastern New York Reformatory, Napanoch.
New York State Custodial Asylum for Feeble-Minded Women, Newark.
New York State Woman's Relief Corps Home, Oxford.
New York House of Refuge, Randall's Island.
New York State Hospital for the Treatment of Incipient Pulmonary Tuberculosis, Ray Brook.
Rome State Custodial Asylum, Rome.
Craig Colony for Epileptics, Sonyea.
Syracuse State Institution for Feeble-Minded Children, Syracuse.
New York State Hospital for the Care of Crippled and Deformed Children, West Haverstraw.

Although no provisions for increased funds were made to cover the work thus added to the regular duties of these two divisions, this work has been actively prosecuted and at the close of the year the examinations and inspections of all of the institutions listed above have been made and the reports when completed are transmitted to the State Fiscal Supervisor and to the Board of Managers of these institutions.

LABORATORY DIVISION

For reporting the work of this division last year, it was found advantageous to group its services under five headings:

A. Educational.

B. Routine investigations for purposes of sanitary control of potable waters and foods.

C. Diagnostic examinations for the detection of infectious disease and control of quarantine.

D. Special investigations of complaints of epidemics or unsatisfactory sanitary matters in various communities and institutions of this State.

E. Preparation and distribution of bacterial products, sera and therapeutic material.

Group A

A further expansion of the educational work of the Laboratory Division was made during the year. After the completion of fifteen short courses described in the preceding year's report, it was found practicable to offer every week in the year a course, for the first four days of each week, in bacteriology; a course for the last four days of each week in chemical and bacteriological examinations of water and milk, and quarterly, a course of four days' duration on the purification of water and sewage, with demonstrations made by members of the staff and of the Engineering Division of this Department of large plants of water filtration and sewage purification in the vicinity of Albany.

The auxiliary laboratory at Ithaca for water analyses and instruction of health officers and students of sanitary science in that vicinity, has been continued with increasing activity throughout the year. Members of the laboratory staff have also given in-

struction in this auxiliary laboratory at Ithaca in methods of sanitary water analysis for ten day periods last year and will repeat this course this year.

About fifty students taking courses at Cornell University have also utilized the courses of this Department in sanitary water analyses offered at its laboratory there.

Twice during the year courses have been offered at the laboratory in Albany for the medical officers of the Department during their meetings there and such courses have been greatly appreciated and seemed to be of great advantage in the training of these men for the particular activity for which they are designed.

In addition to the educational services aforementioned, one or more members of the laboratory staff have lectured at Cornell University in the course of lectures in sanitary science maintained there throughout the year. One of the staff has delivered a public lecture on rabies at a special meeting and invitation of the County Medical Society at Amsterdam, and members of the staff have appeared in conjunction with county medical societies to aid such societies in a special effort to secure a county laboratory for their district, and the Department in assisting such effort, through a member of the Laboratory Division, has appeared before the boards of supervisors of the counties of Allegany, Warren and Westchester to make the public plea that such supervisors should provide a County Laboratory and a well equipped and organized service for their respective counties.

Members of the laboratory staff have also taken active educational part at the Annual Sanitary Conference of Health Officers at Buffalo last November and have contributed very largely to the matter of the special number of the Bulletin distributed to every physician in the State (August number of 1910), and a considerable portion of each number of the Bulletin throughout the year.

A special effort of the Laboratory Division to instruct the physicians using the State antitoxins, in the necessity of making prompt and complete reports, has been made this year by correspondence with those delinquent in furnishing a satisfactory report and as a result of this education of the physician to a realization of his duty in the matter of reporting his use of antitoxin, a far greater percentage of reported cases is available for the anti-

toxin statistical service this year. Continued and more rigorous efforts in this direction, however, must manifestly be made.

Group B

Extending and systematizing the function of the Laboratory Division here classified, which comprises the examination of the potable waters of the State; the control of filtration plants and protection from sewage pollution: 2,662 sanitary water analyses were made during the year 1910, an increase of 32 per cent. over the work of the preceding year. Of this total number of analyses 1,564 were bacteriological examinations (an increase of 25 per cent. over that of the preceding year) and 1,097 were chemical analyses (an increase of 44 per cent. over that of the preceding year).

During the year 1910, 316 public water supplies were examined, and of these various supplies 98 were examined once; 75, twice; 55, three times; 28, four times; 24, five times; 19, six times; 10, seven times; 3, eight times; 3, nine times; and 1, ten times.

The bacteriological examination of spring waters described in the report of the preceding year was repeated this year as a matter of control and these results were supplied to the State Commission in charge of such springs.

It will be noted that in my report of the preceding year it was pointed out that the capacity of the present laboratory facilities was already close to its maximum. It will be noted that a very decided increase in every line of laboratory activity has been accomplished this year, but particular attention is drawn to the fact that this increase has been accomplished only by the most exacting personal effort of members of the staff, working at great disadvantage in unsuitable surroundings and inconvenient facilities.

It is gratifying to find an increased and better systematic laboratory control of our public water supplies, but it is by no means to be concluded that the activity of this closing year realizes in any proper proportion the amount of such work necessarily to be undertaken for any adequate control of the waters of this State.

Group C

The reorganization of this group, undertaken at the beginning of last year, has proved most advantageous. The bringing together of all of the laboratory services under one personal direction has practically abolished any foundation of complaint as to the promptitude and exactitude of the diagnostic service undertaken by the Laboratory Division during the past year. Possibly because of this improvement and also because of the educational policy of the Department in pointing out the utility of laboratory services to the health officers and practicing physicians of the State, it is found that this work is increasing very rapidly, whereas the total number of specimens examined in this service in 1908 was 2,938; in 1909, 3,695; that in 1910, 8,895 such specimens were examined, showing an increase over the work of the preceding year of 141 per cent.

Additional duty imposed upon this Department by the legislation of last year involves the sanitary control of all of the institutions of the State now grouped under the authority of the Fiscal Supervisor, seventeen in number.

The utilization by this Department of laboratory service in connection with this sanitary control, involves a still greater demand upon the bacteriological diagnostic service than heretofore. It is anticipated that the gradual development of county laboratories will relieve the State Laboratory of a portion of the diagnostic work requisite for each locality, but the State Laboratory in almost every case stands in *loco parentis* to all of the county laboratories, and is called upon by these for considerable bacteriological material and consultative advice concerning a large variety of pathological specimens.

It is, therefore, not to be hoped that the county laboratories will in any extent lessen the demands upon the ability and time of the staff, nor of the resources of the State Laboratory.

Group D

During this year special investigations involving the service of members of the Laboratory Staff have been made in conjunction with the Engineering Division, to determine various problems of pollution of the St. Lawrence river throughout its

breadth and depth at Cape Vincent, Clayton and an intermediary point.

Special investigations of filtration plants at Yonkers, Pocantico Lake, Peekskill, Albany and Rensselaer have been made and special investigations of water supplies at New Paltz and Watervliet have been made by members of the Laboratory staff, and the medical inspections of the seventeen State institutions referred to have been made by members of this staff.

The laboratory examinations involved in determining the quality of a number of waters proposed for future public supply have been undertaken by the Laboratory Division at the request of the State Water Supply Commission and the results of all such examinations have been communicated to that commission.

The special investigation undertaken by the Division of Laboratories, at the request of the Saratoga Reservation Commission, has been continued, completed and reported to that commission, and in addition to the technical work involved, the expert service of various members of the staff has been utilized by the latter commission in determining their action upon the technical problems involved.

Group E

The activity of the Antitoxin Laboratory shows a most remarkable development. Throughout the year 1910, 36,916 packages of diphtheria antitoxin of 1,500 units each were prepared and distributed, an increase of 51 per cent. over the output of the preceding year.

The Department has made considerable effort during the year to secure a better use of its antitoxins by physicians and particularly it pointed out in its annual report of the preceding year, and in various issues of the Monthly Bulletin of this year that sufficiently large doses of antitoxin were not being used by attending physicians in the State. The very gratifying increase in the number of complete reports of the use of State antitoxins furnished by the physicians is supplying sufficient data to indicate that the physicians of the State are utilizing antitoxin to a somewhat better degree and the reports thus far received would indicate a very decided decrease in the mortality from diphtheria in all cases where State antitoxin has been used, and a complete

study of the development and directly consequent immediate results in mortality statistics will be made and included in the body of the annual report of this year.

The insufficient resources of the Antitoxin Laboratory have been repeatedly reported and the strain involved to meet the exactions of this service with those resources has become so great as to require a special communication on this matter, which has been made elsewhere.

The educational efforts of the Department to increase the use of its antitoxins and to make known more widely among the medical profession, not only the curative but the prophylactic advantage of antitoxin use, are quite manifest in the increased demand for tetanus antitoxin.

In my report of the preceding year the stationary demand for tetanus antitoxin, which was noted as 4,313 packages of tetanus antitoxin of 1,500 units each, representing the total distribution of 1909, did not differ markedly from the distribution of preceding years. It is gratifying, however, to find that the distribution of this year, 1910, shows 9,655 packages of 1,500 units each of tetanus antitoxin, an increase over the distribution of the preceding year of 102 per cent. and it is hoped, as a result of the educational efforts of the Department and the increased distribution of this antitoxin, that the number of deaths from tetanus, which amounted to over 100 in 1909, may be very decidedly decreased in our future annual statistics.

Throughout the year the Antitoxin Laboratory has distributed solely the concentrated and purified antitoxin and the reports of its use confirm very decidedly the advantage of antitoxin of this form, as well as the advantage of the syringe package, in which package all the diphtheria antitoxin for therapeutic use is now supplied.

The year 1910 was the first full year of the distribution of the special outfits provided by the Department for the prophylactic treatment of ophthalmia neonatorum. A larger number was distributed throughout the year than was made for the initial distribution reported for the year previous.

It is manifest that extensive educational efforts must be made by the Department to secure the utilization of these outfits to their best advantage.

The limited resources of the laboratory and the increased demand for antitoxin have made it impossible to begin the distribution of the material for the treatment of rabies. The laboratory is prepared to undertake this as soon as the resources are provided, as pointed out last year. The expense would be comparatively slight and the benefit obvious.

DIVISION OF COMMUNICABLE DISEASES

During the past year an unusual amount of effective work has been done by this division in conducting an energetic campaign against the prevalence of communicable diseases and in personal investigation at numerous places in which such assistance has been needed.

In contagious and epidemic diseases this portion of the Department comes into more direct contact with the people and more effectually meets their needs than perhaps any other part of the Department.

The thousands of report cards which are received each month by this division are carefully analyzed and studied by the director of this division, and put to such practical advantage as is found possible. This division is now daily utilizing reports received from the 1,400 health officers of the State, and is constantly in touch with such officers and rendering to them every possible assistance in both the prevention of communicable disease and the suppression of any outbreak of the same.

Special investigations are now in progress concerning epidemic poliomyelitis and ophthalmia of the new-born, while much investigative work is contemplated concerning the prevalence of other diseases.

Tuberculosis

Of the 35,000 cases reported of pulmonary tuberculosis, 31,731 came from New York city. As less than one-tenth were from the rest of the State it is clear that far from full record of the cases is being made. In this third year of reporting, the law requiring it having passed in 1908, about two thousand more cases have been returned than in 1909; compared to reported deaths there were 2.5 cases to one death, against 2.4 as in 1909. The number of reported cases to deaths in 1910 in New York city was 3.5. At

this rate the number of cases in the State outside the city would have been three times the number reported and there would have been about 50,000 cases in the State. Whether the average longevity of pulmonary tuberculosis is more than three and one-half years we have no means of knowing, but as not a few cases recover it is probably well within the bounds. It is at any rate quite unlikely that the duration of the disease in the country is less than in the city.

As tuberculosis is a communicable disease and one in which death is more certain to those deprived of fresh air, it would be anticipated that in the crowded parts of a city it would abound most, and this is true. In New York city there were, in the twelve months, 165 deaths from tuberculosis of the lungs and air passages to each 100,000 population; in the rest of the cities taken together the rate was just the same; in the rural part of the State there were 130 deaths to 100,000 population.

In New York city there were 300 more deaths than in 1909, and the consequent death rate, 165 then against 190 this year, is less as the increase is less than that of population. In the other cities there have been on the other hand 300 fewer deaths from tuberculosis in this year than in 1909 and in the rural part of the State there were a few less deaths than in 1909. There is about the same mortality this year as in 1909 for the entire State, but the rate to population, which was 160 last year, is this year 157, which represents a saving of about 300 lives.

The strenuous fight against the White Plague, in which voluntary, civic and national organizations are engaged along with the established health workers, has gone on with unabated effort during the year and it is quite certain is already bringing forth fruit.

Smallpox

There has been a material decrease in the number of cases of smallpox reported during the past year. Since 1898 it has been widespread throughout the country, in a mild form which made its control difficult. The number of cases in 1908 was nearly 1,000; in 1909 it was reduced to 461: this year only 355 cases have been reported. This number of cases is, however, largely to be credited to two areas of

prevalence; one in and about Tonawanda and adjoining towns in Niagara and Erie counties; the other in the northern part of the State, over three-fourths of the cases occurring in these two areas. In the fall of 1909 one sick with smallpox came to North Tonawanda from Canada and the end of this outbreak which ensued was not reached till July, sixty cases occurring there, and as many more in Tonawanda and Niagara Falls, with a few in Buffalo. This outbreak should have been controlled earlier, but there was considerable opposition to vaccination which this Department and the local health officers did all that was possible to counteract. In the northern part of Herkimer county smallpox started in lumber camps in January, remote from observation and oversight, and it was very difficult to control it, for being mostly mild the men ignored it and scattered it to many adjoining towns where it became a source of cost and trouble. It was carried to twenty different towns, not remote, in Jefferson, Lewis and St. Lawrence counties, and in some of them continued until July — 137 cases having been accounted for. In this indifferent and uncontrolled population of sparsely settled communities the difficulties of the case are magnified. These two outbreaks illustrate the obstacles to the control of a disease which, of minor importance now, has become so only through the operation of vaccination. One of them was prolonged by misguided opposition to this and the other by ignorant indifference to it. When everyone is vaccinated there will be no smallpox, and vaccination is the only means by which an outbreak can be promptly suppressed.

There were 355 cases of smallpox, seldom more than one case being reported save in the places above noted, in twenty-eight counties during the year, including Greater New York, where there were sixteen cases. There were seven deaths in the State from this cause, one in Buffalo, one in Walden and five in New York.

Typhoid Fever

With the exception of a few short, spontaneous outbreaks of this disease throughout the State, typhoid fever has prevailed much the same as during the past few years. Much detailed work is contemplated for the coming year, with a view of more effectually preventing the prevalence of this communicable disease. With

this aim in view, it is proposed to daily locate the prevalence of every case of typhoid fever reported to this Department, in its relation to the watersheds of the water supplies of the several municipalities of this State. Having done so, we propose to communicate this information to the health authorities of such municipality that proper prophylactic measures may be taken to prevent the pollution of the water supply of such municipality.

The typhoid bacillus is not disseminated through the air. It may be transmitted by contact with the sick, by attendants, through infected milk or other food, through the agency of the house fly or by carriers for an indefinite period, but drinking water is undoubtedly one of the chief media for its dissemination. The protection of the water supplies of our State is therefore one of the most important parts of our work in the suppression of typhoid fever.

While the department has laid special emphasis on investigation into the sources of all cases of this preventable disease, it proposes to institute even a more active campaign against its suppression. The causes are sometimes obscure, but they should be traced and removed. There have been no prolonged epidemics during the year 1910. There have been 8,536 cases of typhoid fever reported, of which 3,735 were for Greater New York, while 4,801 were scattered throughout the State. There was an increase in both the number of cases reported and in the mortality during 1910, as compared with 1909. There were 1,374 deaths charged to this disease, which is a slight increase over the mortality of 1909. Death occurred in one of the seven reported cases. The bulk of the cases occurred in the months of August, September and October (3,953), almost one-half of the entire number reported during the year. Whether the diagnosis is more frequently made in the cities or not, it is a noticeable fact that the disease appears to be more prevalent in large centers of population, and the deaths of the year have been more largely urban than rural.

Scarlet Fever

There are periods of two or three years of higher prevalence, succeeded by one of lower with scarlet fever. This year is the third of a high period, with a mortality for this State of 1,600.

The anticipation in the report for 1909 that it was on a decline has not been realized, for the deaths are more for this year. It is a cold weather disease; two-thirds of the deaths in 1909 occurred in the first six months of the year, and this year three-fourths, with 450 more deaths than of the year before. Scarlet fever is much less fatal than it was two decades ago, which is true of all the eruptive fevers. The mortality of this year has not been exceeded in fifteen years; prior to that the deaths sometimes exceeded 2,000 in the year. This is because of the milder type of later times, for many cases occur; it is seldom that the disease occurs in the severe and fatal form once not infrequent. There have been reported more than 30,000 cases this year from all parts of the State, and without doubt not a few have failed of report. The mortality has been less than five per cent.

Measles

In 1909 there were more deaths from measles than from scarlet fever. This is not infrequent. The disease is regarded lightly by the people, but on the average it causes yearly in this State 1,100 deaths, while the number from scarlet fever is 1,300. Both have series of years of greater prevalence and mortality, succeeded by years of less. Now for five years measles has had a mortality of from 1,000 to 1,300, and this year as well as last approaches this high range. There were some 50,000 cases reported in 1909; this year the number is near to 70,000. It is, like scarlet fever, a cold weather disease; 1,000 of the deaths this year come in the first six months, or four times as many as in the last half of the year. It has had a lethality of 2 per cent., half that of scarlet fever. More ill conditions follow in its train, however, and it is far from being a disease to hold in light regard. Much has been done this year to instruct the people as to its prevention. As with all the communicable diseases, leaflets of instruction to the people are issued in large numbers in affected localities. Measles is especially a disease to be controlled in good degree by intelligence about it on the part of the people.

Whooping Cough

There were half as many deaths from this minor disease as from measles. But it is not to be held in light esteem, for some years have a mortality in excess of measles and the average yearly for the past twenty-five years has approached 1,000. A measure of control is being imposed, and a leaflet of instruction for this disease has been prepared this year and is placed in the Manual, and used for general distribution where this disease prevails.

Diphtheria

This is a disease of the cities. In 1909 of the 2,300 deaths nearly 2,100 were urban, of which 1,700 were in New York city. This year there were 2,431 deaths, of which 2,190 were urban and 241 rural, the rural population being about one-third the urban two-thirds. New York city reported 17,226 cases, and the rest of the State 5,404. In New York city there were 9 deaths per 100 reported, but as the number of deaths in the rest of the State to reported cases was double this lethality, the inference is that the reports of cases are generally imperfect. The urban mortality is three times that of the rural part of the State, there having been 33 deaths per 100,000 population during the year in the cities, while there were 11 to the same population in the rest of the State. There was no notable epidemic of diphtheria prevalent during the year and the mortality is not materially different from that of recent years. Now for thirteen years, since 1897, the disease has been causing less than one-half the number of deaths that were occurring prior to that time. Indeed the number of actual deaths now, with a greatly increased population, is hardly one-third the number that were occurring twenty-five years ago. No doubt this in part is due to the lessened severity in all the epidemic diseases, in which this disease participates, but since nothing like this decrease is observed in others, such as scarlet fever and measles, it is certainly mainly because of the present day use of diphtheria antitoxin, which is freely made and supplied by this Department. The abrupt diminution in its death rate since this came into use is one of the notable facts in medicine. There has been a decrease from nearly 100 deaths per 100,000 population to one of 25, and a saving of between

3,000 and 4,000 lives a year, mostly through this beneficent agency, certainly a notable triumph for modern sanitary medicine, and one of the assets of the work of this department is the contribution made in the saving of life thus effected.

Epidemic Poliomyelitis

This is not a new disease, but it has of late taken on qualities which make it in effect a new disease, to the sanitarian at least, for it has become, as an evidently infectious and epidemic disease, and almost within the current year, so extensively prevalent as to be pandemic. Prior to 1907 it was in this State of rare occurrence and sporadic. In 1908 a considerable epidemic occurred in and near New York city, while at the same time there was another in Boston, which appears to have been brought by immigrants from Scandinavia where it had become prevalent. From the same source it soon after appeared in Minnesota and other western states. In 1909 there was a single epidemic in this State, in St. Lawrence county. In 1910 it became more general and there have been 227 cases reported from 46 counties. It is a disease of warm weather, and these epidemics began at midsummer and ended at mid-autumn. It occurred in 46 counties, in all parts of the State. Children have been its chief subjects. The number of deaths credited to it for the year is 52, but many, most indeed, of those in whom it has not been fatal have been left with some degree of paralysis. The resources of investigation are being called upon to determine its conditions and prevention. Epidemiological studies are being made by many State Boards of Health. In this State it has been placed among the communicable diseases and a report of the surroundings of each case is called for. Such studies thus far made are to a degree convincing that it is spread by direct contact with the sick and that it may be carried by those who have been attendant on the sick, young children being its chief subjects. It is required, therefore, to be quarantined. Laboratory investigation shows it to be a germ disease, an infectious fever with inflammation of the nervous centres. It has clinical characteristics which define it. Its mortality is not great, its principal effect being a permanent disability which often results in a lifetime of dependence. There is

evidently a low degree of susceptibility to it even among the young who are its chief subjects. It affects a limited epidemic area and is not apparently a disease which becomes implanted in a locality so as to occur in succeeding seasons where it has once been epidemic. It is not conveyed by food or water, but directly by the sick, nor is it a disease of institutions or tenement house districts nor of unhygienic conditions. It appears likely to become a permanent feature of medical work.

Cerebrospinal Meningitis

This is a disease of the cities, as the mortality to population in the cities is double that of the country, or as 6 to 3 per 100,000 population for this year. For recent years it has been a minor disease, causing less than 400 deaths in the twelve months. It is a disease of the colder months, whereas poliomyelitis is one of the warm months.

Pellagra

While in recent years pellagra has arrested attention from its prevalence in some of the southern states and in Illinois in an asylum for the incurably insane, it has not been known to exist in this State during the year save the discovery of one or two sporadic cases among sailors or others coming from abroad. It is a chronic disease marked by nervous disorders and skin lesions and dependent to some degree on impoverishment of surroundings and food. It is most likely to find its way to the hospitals for the insane on account of its effect on the nervous system. The disease has this year been placed among those that are reportable, although there is doubt as to the exact manner of its communication.

Ophthalmia Neonatorum

This disease of the eyes of the new-born whereby they generally become blind, is more important than the number of reported cases indicates. Its report is required as of scarlet fever and other infectious diseases. The Department has joined the current work by voluntary organization of a crusade for its control. Its prevention can be assured by the use of a prophylactic fluid dropped into the eyes and such simple procedures as are not only familiar to physicians but are easily employed by midwives or a

helping neighbor. Such a prophylactic fluid is sent out for free distribution everywhere in the State, along with instructions for use, and leaflets are being extensively distributed to inform all as to the nature, dangers and means for preventing this unhappy ailment. All birth certificates contain a reminder as to the prophylactic. The work of the Department this year has the universal commendation of the medical profession. There have been but 40 cases reported during 1910.

Infant Mortality

While the death rate under five years of age is somewhat appalling when we look at the figures, 38,278 deaths in the year 1910, we can congratulate ourselves and the medical profession in general throughout the State of New York when we compare this mortality rate with that of the year 1900, which was 39,204, a saving of 1,000 this year from the deaths on every life of ten years ago. At the same time the mortality at all ages was increased by over 11,000 in 1910 as compared with 1900, and the percentage of deaths under five years to the total death rate in 1900, was 30.50 while that of the year 1910 was 27.35, a marked decrease in the percentage of deaths under five years.

The causes of infant mortality are complex and present some of the most important features of the conservation of the health of the children. Milk being the staple food of the babies, it behooves us to exercise great care with this product. In municipalities where the greatest care is taken in the purity of the milk supply, we find the lowest infant mortality. There is an essential feature in the milk industry which properly falls within the province of the health officers throughout the State, viz.: the prevention of the spread of contagious diseases such as typhoid fever, scarlet fever, diphtheria, etc., through the milk supply.

The diarrheal mortality of midsummer and early autumn is largely of young children. Conditions of the weather, crowded habitations and sociological conditions contribute to the sickness and death among these susceptible subjects. While these are not all within the controllable authority of boards of health, there are many things that can be remedied by their efforts and they have already accomplished a decreasing mortality rate of infancy and early childhood.

Health Officers

The health officers of the different towns, villages and cities for the most part are careful and conscientious men, and are doing excellent work in the suppression of communicable diseases, but they are often hampered not only by lack of funds but also by the fact that in many cases they antagonize their friends and neighbors, who resent their interference, while frequently outside advice and counsel is hailed with delight and meets with hearty approval. The most cordial relations are enjoyed between the 1,400 health officers of the State and the Department of Health. Mutual assistance is daily extended and an increasing efficiency is apparent to those who watch the results being obtained.

During September, Medical Officers of Health made an investigation as to the prompt reporting of communicable diseases, also regarding quarantine and other efforts put forth by the health boards to prevent the needless spread of preventable diseases. In the majority of cases the Medical Officers met with hearty cooperation from the health officers and health boards throughout the State.

Some of the rural districts do not observe the provisions of the tuberculosis law as fully as could be desired. This will probably be remedied in the near future, as the tuberculosis exhibit now on the road is rousing not only the physicians, but the laity as well, to a sense of their duty to co-operate fully in the effort to suppress the "White Plague."

DIVISION OF PUBLICITY AND EDUCATION

Monthly Bulletin

The Monthly Bulletin continues to prove a useful medium between the Department and the health officers, and to exercise an educative influence upon the wide circle of general readers which it reaches.

During the year we have issued two special numbers, one dealing with the "Pollution of Streams," and the other addressed particularly to the medical profession of the State. A copy of this issue was mailed to every physician outside of Greater New

York. Among the special articles it contained was one outlining the work of the several divisions of the Department, and there were others pointing out various ways in which physicians can co-operate with the Department and the Department with physicians, for the protection of the health of individuals and of the community.

Circulars

The demand for the various circulars on Communicable Diseases, etc., issued by this division, has been steadily maintained during the past year. A number of them have been recently revised preparatory to the printing of further supplies.

Public Health Manual

Considerable effort has been put into the preparation of a complete Public Health Manual which can constitute a working guide for our health officers. In this volume we have incorporated the Public Health Law, and such parts of other statutes which lay duties upon local boards of health or the health officers. A model set of sanitary regulations is given for the guidance of local boards of health. The procedure governing the protection of public water supplies and the installation or extension of sewerage systems and sewage disposal plants is set forth. The requirements of the Department in the control of cases of communicable diseases are gone into at some length. The use of the State Hygienic Laboratory and of the antitoxins and sera made by the Department is discussed.

A chapter is devoted to a general survey of the work devolving upon the health officer. A special section is devoted to vital statistics, and other phases of work and matters of interest to the health officers are discussed.

Annual Sanitary Conference

The Tenth Annual Conference of the Sanitary Officers of the State of New York was held in the auditorium of the Y. M. C. A. in Buffalo on November 16, 17 and 18, 1910.

The attendance was good, but the Department looks forward to the day when every health officer, instead of one out of two or three, shall be present at this "school of instruction." In order

to bring this about it will be necessary for an "enlightened" self-interest in each community to not only defray the expenses of the health officer, but to grant him a reasonable per diem allowance as partial compensation for the loss of income occasioned by his being away from the practice from which, as a physician, he derives his means of existence.

The program presented at the Buffalo Conference was as follows:

First Session — Wednesday, November 16, 11:00 A. M. to 1:00 P. M.

Address of Welcome. Hon. Louis P. Fuhrmann, Mayor of Buffalo; Francis E. Fronczak, M.D., Health Commissioner, Buffalo.

I. PUBLIC HEALTH AND THE SCHOOL.
- (*a*) As an Aid to Public Health Work. John S. Wilson, M.D., Medical Officer, State Department of Health, Poughkeepsie.
- (*b*) Follow-up Work. Franklin W. Barrows, M.D., Medical Inspector of Schools, Buffalo.
- (*c*) School Hygiene and School Disease. Edward Clark, M.D., Medical Officer, State Department of Health, Buffalo.
- (*d*) From Standpoint of Educationalist, Thos. E. Finegan, Assistant Commissioner of Education.

Discussion by John L. Hazen, M.D., Brockport; John L. Hughes, M.D., Mt. Vernon.

II. PUBLIC HEALTH AND THE DENTAL PROFESSION.

William G. Ebersole, M.D., D.D.S., Cleveland, Ohio.

Discussion by W. A. White, D.D.S., Phelps; W. W. Belcher, D.D.S., Rochester.

III. PUBLIC HEALTH AND THE MEDICAL PROFESSION.
- (*a*) The Difficulties of Health Officers as Seen by the Physician. A. D. Lake, M.D., Medical Officer, State Department of Health, Gowanda.
- (*b*) The Spirit of Mutual Helpfulness. Wm. D. Alsever, M.D., Medical Officer, State Department of Health, Syracuse.

Discussion by Charles S. Clowe, M.D., Schenectady; O. W. Burhyte, M.D., Brookfield.

Second Session — Wednesday, November 16, 3:00 P. M. to 5:00 P. M.

IV. PUBLIC HEALTH AND THE PRESS.
- (*a*) From the Health Officer's Standpoint. John B. Huber, M.D., Medical Officer, State Department of Health, New York.
- (*b*) From the Newspaper Man's Standpoint. Mr. F. P. Hall, Jamestown.

Discussion by Hon. Charles F. Milliken, Canandaigua; William H. Snyder, M.D., Newburgh.

V. PUBLIC HEALTH AND MUNICIPAL AUTHORITIES.
- (*a*) What a Health Department Expects From Municipal Authorities. Eugene H. Porter, M.D., State Commissioner of Health.
- (*b*) From the Standpoint of the Municipal Officer. Mayor Charles C. Duryee, Schenectady.

Third Session — Wednesday, November 16, 8:00 P. M. Public Meeting.

I. PUBLIC HEALTH AND THE CONSERVATION MOVEMENT.

C. A. Hodgetts, M.D., Medical Adviser, Commission of Conservation, Ottawa.

II. PUBLIC HEALTH AND THE PUBLIC PURSE.

Col. Francis G. Ward, Commissioner of Public Works, Buffalo.

Fourth Session — Thursday, November 17, 10:00 A. M. to 12:00 noon. Sectional Meetings.

(*a*) For City Health Officers. Chairman Francis E. Fronczak, M.D., Health Commissioner, Buffalo.

1. Garbage Disposal. P. M. Hall, M.D.. Health Officer, Minneapolis.

Discussion by William D. Peckham, M.D., Utica; John J. Mahoney, M.D., Jamestown.

2. City Sanitation. Prof. Charles Baskerville, College of the City of New York.

Discussion by William S. Coons, M.D., Yonkers; George E. Ellis, M.D., Dunkirk.

3. Milk and Foods, F. E. Fronczak, M.D., Health Commissioner, Buffalo.

Discussion by D. M. Totman, M.D., Syracuse; F. B. Parke, M.D., Elmira.

(*b*) For Rural Health Officers. Chairman Wm. A. Howe, M.D., Deputy State Commissioner of Health.

1. Rural Hygiene. Allen W. Freeman, M.D., Assistant State Commissioner of Health. Richmond, Va.

Discussion by Charles S. Butler, M.D., Harpursville; B. F. Chase. M.D., East Syracuse; G. Scott Towne, M.D., Saratoga Springs,

2. Brief Talks by Heads of Divisions.

(*c*) For Medical Officers of Health.

Afternoon

No formal session held this afternoon. Health Officers had the choice of attending a Demonstration at the Cancer Laboratory; a Tuberculosis Clinic: of making a Trip through the Buffalo Stockyards, through the courtesy of Dr. Wm. H. Heath, Chief Inspector of Foods and Drugs, Buffalo Department of Health; or a Trip to Niagara Falls.

Social Evening

Smoker at Hotel Iroquois, 9 P. M.

Fifth Session — Friday, November 18, 10:00 A. M. to 12:00 noon.

I. THE LABORATORY AS AN AID TO DIAGNOSIS.

Dr. John A. Amyot, Director Laboratories. Provincial Board of Health, Toronto.

Discussion by O. J. Hallenbeck. M.D.. Canandaigua: W. W. Waite, M.D., Syracuse.

II. REPORTING COMMUNICABLE DISEASES.

Dr. E. C. Levy. Health Officer. Richmond, Va.

Discussion by John Dugan, M.D., Albion; E. S. Willard, M.D., Watertown.

III. QUARANTINE, ISOLATION AND DISINFECTION.

William A. Howe. M.D., Deputy State Commissioner of Health.

Discussion by Harry S. Tuthill, M.D., Penn Yan; Frank S. Overton, M.D., Patchogue.

IV. THE CONTROL OF TYPHOID FEVER.

H. W. Hill, M.D., Director Epidemiological Division, Minnesota State Board of Health, Minneapolis, Minn.

Discussion by Joseph Roby, M.D., Rochester; F. N. C. Jerauld, M.D., Niagara Falls.

Sixth Session — Friday, November 18, 2:00 P. M. to 4:00 P. M.

I. UNATTACKED COMMUNICABLE DISEASES.

Gardner T. Swarts, M.D., Secretary State Board of Health, Providence, R. I.

Discussion by J. W. Le Seur, M.D., Batavia: G. W. Goler, M.D., Rochester.

II. EPIDEMIC ANTERIOR POLIOMYELITIS.
Surgeon W. H. Frost, U. S. Public Health and Marine Hospital Service, Washington, D. C.
Discussion by Irving M. Snow, M.D., Buffalo.

III. THE TUBERCULOSIS CAMPAIGN AS CONDUCTED BY THE STATE DEPARTMENT.
Mr. Charles W. Fetherolf, Director Tuberculosis Exhibits.

School of Sanitary Science at Cornell University

The Department has again co-operated with the authorities of Cornell University by providing for one-half of the lectures given in that university in Sanitary Science and Public Health. This course continues to be popular with the students and there can be no question of the value of the interest it is arousing among our educated citizens in public health work and the prevention of disease. A work so meritorious deserves to be put upon a permanent basis; at present it is largely a voluntary effort, no remuneration being available for the lecturers who give of their valuable time and to whom the cause of sanitation is greatly indebted.

The success of this course has amply justified my assertion last year that our colleges should have instruction in sanitary science, and that this work at Cornell should be on a firm basis. It is my earnest desire that the Legislature will recognize the value of this school, and place it on a stable foundation.

The list of lecturers and lectures for 1910–1911 is as follows:

First Term

October 4. Introductory lecture, outlining field and subject-matter of the course. President J. G. Schurman, Cornell University.

October 6. The History of Therapeutics, Dr. G. W. Goler, Health Officer, Rochester, N. Y.

October 11. Public Health Administration, E. H. Porter, M. D., State Commissioner of Health, Albany, N. Y.

October 13. State Control of Certain Insanitary Conditions, E. H. Porter, M.D., State Commissioner of Health, Albany, N. Y.

October 18. The Application of the Laws of Heredity to Public Health, S. H. Gage, B.H., Professor Emeritus of Histology and Embryology, Cornell University.

October 20. Infant Mortality, Albert Sudekum, M.D., Member of Reichstag, Nuremberg, Germany.

October 25. Prolongation of Human Life, W. F. Willcox, LL. D., Professor of Political Economy and Statistics, Cornell University.

October 27. Marriage and Divorce, W. F. Willcox, LL. D., Professor of Political Economy and Statistics, Cornell University.

November 1. The Birth Rate, W. F. Willcox, LL. D., Professor of Political Economy and Statistics, Cornell University.

November 3. The Conservation of Human Life, L. L. Seaman, M.D., Surgeon, New York city.

November 8. European Problems of Public Health, F. A. Fetter, Ph. D., Professor of Political Economy and Finance, Cornell University.

November 10. American Philanthropy and the Public Health, F. A. Fetter, Ph. D., Professor of Political Economy and Finance, Cornell University.

November 15. The Nature of Disease, V. A. Moore, M.D., Director of the New York State Veterinary College, Cornell University.

November 17. Micro-Organisms and Their Relation to Disease, V. A. Moore, M.D., Director of the New York State Veterinary College, Cornell University.

November 22. Diseases of Animals Transmissible to Man, V. A. Moore, M.D., Director of the New York State Veterinary College, Cornell University.

November 29. The Development of Public Health Law, A. H. Seymour, Esq., Secretary State Department of Health, Albany, N. Y.

December 1. Applications of Public Health Law to Specific Regulations, A. H. Seymour, Esq., Secretary State Department of Health, Albany, N. Y.

December 6. Influence of Agricultural Products on Public Health, Hon. R. A. Pearson, State Commissioner of Agriculture, Albany, N. Y.

December 8. School Hygiene, G. M. Whipple, Ph. D., Assistant Professor of the Science and Art of Education, Cornell University.

December 13. Problems of Life and Health in Industry, Frederick L. Hoffman, Statistician, Prudential Life Insurance Co., Newark, N. J.

December 15. Insanity and Public Health, W. L. Russell, M.D., formerly Inspector New York State Commission in Lunacy, Albany, N. Y.

December 20. Health in Agricultural Communities, L. H. Bailey, LL.D., Director of New York State College of Agriculture, Cornell University.

January 5. Voluntary Organizations in Public Health Work, Hon. Homer Folks, Secretary State Charities Aid Association, New York city.

January 10. Transmission and Prevention of Some Infectious Diseases, Dr. V. E. Sorapure, Professor of Pathology, Fordham College, New York city.

January 12. Immunity, Dr. V. E. Sorapure, Professor of Pathology, Fordham College, New York city.

January 17. Preparation of Antitoxins, W. S. Magill, M.D., Director of State Hygienic Laboratory, Albany, N. Y.

January 19. The Value of Antitoxins in Certain Infectious Diseases, W. S. Magill, M.D., Director of State Hygienic Laboratory, Albany, N. Y.

January 24. The Campaign Against the Hookworm, W. H. Glasson, Acting Professor of Economics and Politics, Cornell University.

January 26. Health Conditions Among the American Negroes, W. H. Glasson, Acting Professor of Economics and Politics, Cornell University.

Second Term

February 14. Cancer and Its Relation to Public Health, James Ewing, M.D., Professor of Pathology, Cornell University Medical College, New York city.

February 16. The Occupational Diseases of Modern Life, W. G. Thompson, M.D., Professor of Medicine, Cornell University Medical College, New York city.

February 21. Insects and the Transmission of Disease, A. D. MacGillivray, Ph. D., Assistant Professor of Entomology and Invertebrate Zoology, Cornell University.

February 23. Insects and the Transmission of Disease, A. D. MacGillivray, Ph. D., Assistant Professor of Entomology and Invertebrate Zoology, Cornell University.

February 28. The Correspondence of Mental and Physical Conditions, W. A. White, M.D., Superintendent of the Hospital for the Insane, Washington, D. C.

March 2. Health Conditions in the Philippines, E. W. Kemmerer, Ph. D., Assistant Professor of Political Economy, Cornell University.

March 7. Tuberculosis, Its Nature and Causes, John B. Huber, M.D., Lecturer, Fordham College, New York city.

March 9. Tuberculosis, Its Prevention and Cure, John B. Huber, M.D., Lecturer, Fordham College, New York city.

March 14. Some Facts and Fallacies Concerning Tuberculosis, J. H. Pryor, M.D., Member of Tuberculosis Advisory Board, New York State Department of Health, Buffalo, N. Y.

March 16. Early Diagnosis of Tuberculosis, Lawrason Brown, M.D., Trudeau Sanitarium, Saranac Lake, N. Y.

March 21. Local Quarantine Measures, L. E. Cofer, M.D., U. S. Public Health Service, Washington, D. C.
March 23. The Supervision of Infectious Diseases, H. H. Crum, M.D., Health Officer, Ithaca, N. Y.
March 28. Food Adulteration and Its Effects, H. W. Wiley, Department of Agriculture, Washington, D. C.
March 30. The Detection of Food Adulteration, E. M. Chamot, Ph. D., Professor of Sanitary Chemistry and Toxicology, Cornell University.
April 4. The Detection of Food Adulteration, E. M. Chamot, Ph. D., Professor of Sanitary Chemistry and Toxicology, Cornell University.
April 11. The Dangers of Impure Milk, W. A. Stocking, M. S., Assistant Professor Dairy Bacteriology, Cornell University.
April 13. Dairy Hygiene, W. A. Stocking, M. S., Assistant Professor of Dairy Bacteriology, Cornell University.
April 18. Animal Wastes and Their Disposal, G. W. Cavanaugh, B. S., Assistant Professor of Chemistry, Cornell University.
April 20. The Law of Nuisances, Alfred Hayes, Jr., LL. B., Professor of Law, Cornell University.
April 25. The Purification of Drinking Water, J. L. Leal, M.D., Sanitary Adviser of the East Jersey Water Co., Paterson, N. J.
April 27. Principles of Water Purification, G. C. Whipple, Consulting Engineer. New York city.
May 2. Water Purification Plants, Theodore Horton, Chief Engineer, State Department of Health, Albany, N. Y.
May 4. The Problem of Sewerage, H. N. Ogden, C. E., Professor of Sanitary Engineering, Cornell University.
May 9. Sewage Disposal Plants, H. B. Cleveland, Principal Assistant Engineer, State Department of Health, Albany, N. Y.
May 11. The Sewage Disposal of a Large City, E. B. Whitman, C. E., Engineer in charge of Sewage Disposal, Baltimore, Md.
May 16. Street Cleaning, William H. Edwards, Esq., Commissioner of Street Cleaning, New York city.
May 18. House Planning with Reference to Public Health, Professor C. A. Martin, Director of the College of Architecture, Cornell University.
May 23. The Healthful House, Professor C. A. Martin, Director of the College of Architecture, Cornell University.
May 25. The Principles of Ventilation, R. C. Carpenter, M. S., C. E., Professor of Experimental Engineering, Cornell University.
May 30. The Applications and Results of Ventilation, R. C. Carpenter, M. S., C. E., Professor of Experimental Engineering, Cornell University.
June 1. Health in Rural Communities, G. N. Lauman, B. S. A., Assistant Professor of Rural Economy, Cornell University.

The Service of the Press

The press of the State has shown an increasing interest in health matters and has been of immense assistance in the publication of material pertaining to the subject.

The educational effect has been marked and the assistance thus rendered is appreciated.

Instruction for Health Officers

In addition to the laboratory courses open to health officers and other meetings designed for their benefit, the Department has been able, through the courtesy of Dr. Alvah H. Doty, health officer

of the Port of New York, to offer an opportunity for study there, of the methods of inspection, diagnosis, disinfection and quarantine used in guarding our great seaport.

Many of the health officers in the State availed themselves of this, and all have been enthusiastic over the instruction gained.

The health service of the State owes Dr. Doty much for his interest and willingness to co-operate in this way and the knowledge gained cannot fail to be of value to the people.

Publicity at the State Fair

For the second time the Department was represented at the State Fair at Syracuse. In the space allotted to the Department were shown maps denoting the prevalence of various communicable diseases; diagrams and tables to demonstrate in a popular way the value of vital statistics; plans and pictures of filtration and sewage disposal plants, etc. One feature that proved very attractive was a working model of a sewage disposal plant. Another model graphically called attention to the small sum appropriated by the State to its Public Health Department, as compared with the money devoted to the protection of the health of plants and animals. A large amount of literature was distributed during the week the fair was open, one piece being a special four-page circular giving a brief but comprehensive account of the work done by the Department for the citizens of the State.

Public Lectures

For some time past there has been in course of preparation a series of illustrated public lectures on various phrases of public health work. The lectures above mentioned have been prepared with a view to their being put in such form that they can be sent with a set of slides to a health officer in any part of the State who may be called upon or have the opportunity to use the lecture platform to reach the people of his community and interest them in hygienic living and the preservation of health, which can easily be demonstrated to be the most valuable phase of the increasingly popular conservation movement.

DIVISION OF VITAL STATISTICS

It is gratifying to note that the earnest effort of the Department to bring about a more complete and satisfactory registration of births and deaths occurring in the State during the past year has resulted in obtaining the active co-operation of the local boards of health in enforcing compliance with the provisions of section 22 of the Public Health Law.

With but few exceptions the local boards are awake to the importance of all births and deaths being promptly reported, and the returns now being received at the Department are more complete and satisfactory than at any time since the enactment of the State registration laws in 1880.

The living births reported to the Department for the past year numbered 213,235, which is 10,579 more than were reported in 1909, and showing a birth rate of 23.3. The number of stillbirths reported in 1910 was 9,952.

Of the living births 210,315 were white and 2,920 colored. The latter were classified as follows: Negro, 2,874; Indian, 28; Mongolian, 18. Of these 213,235 living births, 109,214 were male, 103,992 female, and sex of 29 not reported.

The average city birth rate was 25.3, and the rural 16.1. The cities having the highest birth rate were: Dunkirk, 32,7; Rome 27.7; North Tonawanda, 27.6; Little Falls, 27.2; Greater New York, 26.9; Lackawanna, 26.7; Niagara Falls, 26.5, and New Rochelle, 25.8.

The lowest birth rate is shown in the following cities, due to incomplete registration: Troy, 12.4; Albany, 13.6; Watervliet, 13.9; and Rensselaer, 15.6. Troy reports 641 more deaths than births; Albany, 576; Watervliet, 51, and Rensselaer, 9. Other cities reporting less births than deaths were Cohoes, Cortland, Ithaca, Kingston, Lackawanna, Middletown and Port Jervis.

The total number of deaths reported for 1910 was 147,629, and the death rate for the year was 16.1. The urban death rate was 16.1; the rural 16.3. The relative mortality in early childhood is low. For fifteen years prior to 1900 there were 32.2 per cent. occurring under five years of age; for the next ten years, 27.5, and last year 27.0 per cent.; 18.5 per cent. of the deaths were under one year and 31.0 per cent. at sixty years and over.

The deaths past sixty years of age were more than for any prior year, increasing somewhat in proportion to increase in deaths from acute respiratory diseases.

The cities having the highest death rates were: Lackawanna, 27.3; Troy, 20.8; Hudson, 20.6; Cohoes, 20.6, and Rome, 19.9.

New Rochelle has the lowest death rate, 11.7; and the following cities show a reported death rate of 14.0 and under: Rochester and Geneva, 14.0; Mt. Vernon, 13.9; Johnstown, 13.7; North Tonawanda, 13.3; Olean, 12.7; Jamestown, Hornell and Tonawanda, 12.8; New Rochelle, 11.7.

Of the largest cities in the State, Rochester shows the lowest death rate, 14.0. Of the smaller cities Geneva has a like rate.

The total reported mortality from pulmonary tuberculosis was 14,059, or 9.5 per cent. of all deaths. There were 153 deaths per 100,000 population. Ten years ago, with a census population less by 2,000,000, there were 13,600 deaths, or but 275 less than now, and 187 deaths per 100,000 population. In 1890, with a population of 6,000,000, there were 12,400 deaths, a rate of 205 deaths per 100,000 population. The urban rate is 165 deaths per 100,000 population; the rural, 135. There were 100 more deaths than in 1909, but it is less than in the five years preceding. For the entire period of twenty-five years 11.0 per cent. of the deaths have been from consumption; last year 10.0 per cent., this year 9.5 per cent. From tuberculosis other than pulmonary there were 2,278 deaths, the largest number, one-half being from tubercular meningitis, and the next numerically abdominal tuberculosis, 385.

Pneumonia caused 9,867 deaths, 444 more than in 1909, 1,200 more than in 1908, but fewer than in the years preceding; 109 deaths per 100,000 population in the cities, and 103 in the rural population alike. From broncho-pneumonia there were 7,248 deaths, and from acute bronchitis 1,598. These were chiefly fatal in March, and during the annually recurring epidemic of influenza, which is given as the direct cause of 1,452 deaths.

Cancer, showing in each succeeding year an increase, has this year caused 7,522 deaths; in 1900 there were 4,871; in 1890, 2,868. In the cities there were 80 deaths per 100,000 population; the rural rate was 99. Compared with tuberculosis, its

urban mortality was less than half, its rural considerably more than half the number from that cause.

Typhoid fever has caused during the year 1,374 deaths. This is about the mortality for the last two years, while the average yearly for twenty years prior was 1,600 deaths, and most of the years were close to the average. The rate of mortality, 15 per 100,000 population, is the same as that of 1909, and the lowest ever recorded for the State. The urban mortality from typhoid fever was 14.9 per 100,000 population; the rural was 15.2; in the cities .93 per cent. of the deaths were from typhoid fever, in the country .94 per cent.

Diphtheria caused 2,433 deaths, 120 more than in 1909, 40 less than in 1908, 350 less than the yearly average of the past twelve years of low mortality, and 3,000 less than the average of the twelve years prior to that. In the urban population there were 32 deaths per 100,000 during the year; in the rural 10 from diphtheria. Sixty-four per cent. of the deaths occurred in the winter and spring months.

Scarlet fever was more prevalent than last year, and the deaths were 1,617 to 1,205 in 1909. There were 21 deaths per 100,000 population in the cities, and 8 in the rural population. New York city shared in the increase of mortality over last year to a less extent than the rest of the State.

Measles which last year had a mortality in excess of that from scarlet fever, has now 1,285 deaths, or 332 less. In eleven years of the last twenty-five, the deaths from measles have exceeded those from scarlet fever and their average mortality has been annually 1,100 to 1,350. Taking account of its remote effects, measles is probably fully as large a contributor to mortality as scarlet fever. The urban mortality has decreased but the rural is nearly double that of 1909. Six-sevenths of the cases and four-fifths of the deaths occurred during the first six months of the year.

Whooping cough, which has had an average yearly mortality for twenty-five years of 900, has now 727 deaths. In August the largest number, as heretofore noted, occurred, with July nearly as many, the smallest mortality having been in the winter months. The relative urban and rural mortality was the same.

Cerebrospinal meningitis caused 452 deaths, an increase over the two years preceding, but one-half that of the three prior years. Cases were reported from thirty-five counties, two-thirds of the deaths occurring in New York city.

There were fifty-eight deaths from epidemic poliomyelitis.

Smallpox caused 7 deaths — 1 at Buffalo, 1 at Walden, and 5 in New York city.

Violence was the cause of 9,846 deaths — 614 more than in 1909. There were 1,479 by suicide, 420 homicides and 7,695 accidental.

Complete returns of marriages occurring in the State during 1910 are still lacking at the Department, but reports received from the county clerks indicate that there were about 85,500. The total number reported in 1909 was 80,090.

Respectfully submitted,

EUGENE H. PORTER, M.D.,
State Commissioner of Health

February 6, 1911

APPENDIX

THIRTY-FIRST ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

FINANCIAL STATEMENT

Disbursements for the Fiscal Year Ending September 30, 1910

SALARIES

Division of Administration

Eugene H. Porter, M.D., Commissioner	$5,000 00
Alec H. Seymour, secretary	3,125 00
Fenimore D. Beagle, chief clerk and registrar	2,475 00
Edward C. Kenny, stenographer	1,800 00
Marion L. Peters, stenographer	1,080 00
Harry Crotty, page	480 00
Total	$13,960 00

Temporary Services

Helen L. MacQuide, telephone operator	$440 00
Eleanor M. Roosa, stenographer	300 00
Grace McCollom, stenographer	18 26
Minnie S. Warner, clerk	95 60
Katherine C. Judd, laborer	347 09
Total	$1,200 95

Division of Engineering

Theodore Horton, chief engineer	$4,500 00
H. B. Cleveland, principal assistant engineer	2,400 00
Henry N. Ogden, special assistant engineer	860 00
C. A. Holmquist assistant engineer	1,500 00
Charles F. Breitzke, assistant engineer	125 00
O. A. True, assistant engineer	592 66
Homer L. Higley, stenographer	558 00
A. Dudley Mills, stenographer	286 00
Total	$10,821 66

Division of Vital Statistics

Charles E. Thompson, clerk	$375 00
A. K. Cole, clerk	1,575 00
William A. Wallace, clerk	1,500 00
Jeremiah Grogan, Jr., clerk	1,500 00
Ella H. Porter, clerk	1,125 00
Rae Samuels, clerk	720 00
Meta E. Mills, clerk	855 00
Anna B. Byrne, clerk	900 00
Eleanore C. Gibb, junior clerk	690 00
*Estelle Jarvis, junior clerk	50 00
Emma H. Kelly, junior clerk	368 38
Ruth Van Noy, stenographer	288 00
Total	$9,946 38

Division of Communicable Diseases

Wm. A. Howe, director	$1,187 50
Cora Partridge, clerk	600 00
Alice M. Fuller, stenographer	900 00
Eleanor M. Roosa, stenographer	250 00
Total	$2,937 50

Antitoxin Laboratory

William S. Magill, M.D., director	$2,833 32
I. H. Lindsay, clerk	1,500 00
Mary C. Cuthbert, stenographer	455 00
*Grace McCollum, stenographer	50 00
Mrs. J. Cruickshank, cleaner	630 00
Mrs. Fannie Mainster, cleaner	480 00
Mrs. Charles Schadler, cleaner	82 50
Margaret Hill, cleaner	480 00
Elizabeth R. Lampman, cleaner	212 00
Margaret Bott, cleaner	80 00

*Transferred to Labor Department.
† Granted leave of absence November 1, 1909.

Bessie McComb, cleaner	$60 00
Charles Schadler, stableman	720 00
Walter Reynolds, assistant stableman	525 00
Total	$8,107 84

Hygienic Laboratory

Leonard M. Wachter, chemist	$2,100 00
W. G. Fellows, assistant bacteriologist	630 00
Herbert Ant, water analyst	465 16
W. S. Davis, water analyst	143 22
Leslie R. Milford, water analyst	150 00
Wm. A. Bing, M.D., assistant bacteriologist	699 97
Blanche C. Vose, cleaner	600 00
T. G. Conklin, laborer	600 00
Jno. C. Reynolds, laborer	100 00
F. B. Pedrick, laborer	150 00
	$5,638 35

Cancer Laboratory

H. R. Gaylord, M.D., director	$3,583 26
G. H. A. Clowes, chemist	1,749 99
Burton G. Simpson, M.D., clinical pathologist	624 99
F. W. Baeslack, assistant biologist	800 00
C. A. Maclay, secretary	975 00
D. Averill, assistant in photo-chemistry	975 00
F. A. Payne, janitor	360 00
Jesse McCarney, laborer	435 00
Guy Owen, laborer	675 00
Fred West, laborer	246 00
Ed. Sears, laborer	46 00
John Coburg, laborer	600 00
Chas. Stephan, laborer	32 00
Chas. Gerlach, laborer	40 00
* Arthur Johnson, laborer	5 40

* Temporary.

Anna Gerlach, laborer	$35 00
* Thomas Woodcock, laborer	12 00
	$11,194 64

Tuberculosis Exhibition

Chas. W. Fetherolf, director	$1,875 00
Paul Bernhardt, laborer	540 00
* Dr. George W. Beach, lecturer	60 00
* Dr. John H. Pryor, lecturer	20 00
* Dr. H. B. Doust, lecturer	20 00
* Dr. M. E. Leary, lecturer	20 00
	$2,535 00

** Temporary Employees*

Services investigating outbreaks of communicable diseases, registration of vital statistics, sewage disposal, stream pollution, public nuisances and general local sanitary conditions.

Dr. F. C. Curtis, medical expert	$1,485 00
Dr. Wm. A. Howe, medical expert	310 00
Dr. Hills Cole, medical expert	930 00
Dr. Edward Clark, medical expert	215 00
Dr. John B. Huber, medical expert	940 00
Dr. D. C. Moriarta, medical expert	90 00
Dr. E. E. Larkin, medical expert	30 00
Dr. Geo. E. Swift, medical expert	60 00
Dr. W. S. Garnsey, medical expert	70 00
Dr. G. W. Miles, medical expert	70 00
Dr. S. A. Russell, medical expert	20 00
Dr. E. S. Willard, medical expert	225 00
Dr. F. J. Mann, medical expert	30 00
Dr. D. M. Hibbard, medical expert	60 00
Dr. O. W. Peck, medical expert	120 00
Dr. O. J. Hallenbeck, medical expert	80 00

* Paid out of appropriation for suppression of communicable diseases, and investigations.

Dr. C. H. Gildden, medical expert	$20 00
Dr. Jos. Roby, medical expert	80 00
Dr. F. W. Adriance, medical expert	20 00
Dr. B. J. Maycock, medical expert	10 00
Dr. C. E. Birch, medical expert	60 00
Dr. G. M. Fisher, medical expert	80 00
Dr. H. H. Crum, medical expert	80 00
Dr. F. D. Andrew, medical expert	80 00
Dr. D. M. Totman, medical expert	50 00
Dr. E. H. Wolcott, medical expert	20 00
Dr. R. A. DeKay, medical expert	40 00
Dr. A. D. Lake, medical expert	90 00
Dr. J. W. LeSeur, medical expert	130 00
Dr. W. H. Connelly, medical expert	60 00
Dr. W. O. Alsever, medical expert	20 00
Dr. E. H. Hutton, medical expert	80 00
Dr. F. D. Earl, medical expert	180 00
Dr John S. Wilson, medical expert	90 00
Dr. John B. Garrison medical expert	70 00
Dr. W. B. Gibson, medical expert	70 00
Dr. B. S. Sherwood, medical expert	20 00
Dr. A. G. Wilding, medical expert	30 00
Dr. C. F. Ormes, medical expert	20 00
Dr. W. W. Thompson, medical expert	80 00
Dr. Z. F. Dunning, medical expert	30 00
Dr. Wm. T. Sedgwick, lecturer	75 00
E. Hoffman, lecturer	330 00
Jas. C. Marriott, stenographic services, tuberculosis hospital hearings	919 40
X. H. Goodnough, civil engineer, examination of sewage disposal plans and reported same	200 00
T. Herbert Snow, civil engineer, examination of sewage disposal plans and report on same	200 00
Hazel & Whipple, civil engineers, examination of sewage disposal plans, and report on same	200 00
Dr. Thos. S. Carrington, examination of and report on plans for county tuberculosis hospitals	150 00
Albert F. Forthmiller, stenographic services in investigation of mineral springs at Saratoga	62 00

Prof. W. F. Willcox, consulting statistician......	$350 00
Charles F. Breitzke, inspecting engineer........	880 00
Prof. H. N. Ogden, special sanitary engineer....	100 00
Hiram G. Conger, sanitary inspector...........	20 00
Carl Crandall, sanitary inspector..............	75 00
E. M. Chamot, sanitary inspector	10 00
Fritz M. Arnolt, sanitary inspector.............	276 00
M. W. Brower, sanitary inspector..............	85 00
Geo. T. Palmer, sanitary inspector.............	80 00
T. G. George, sanitary inspector...............	45 00
John M. Sill, sanitary inspector................	90 00
W. B. Clift, sanitary inspector................	243 00
Robt. L. Tate, sanitary inspector...............	216 00
W. J. McKee, sanitary inspector	12 50
Theo. B. Whittemore, sanitary inspector........	204 00
Harmon B. Smith, draftsman	98 00
	$11,175 90

The following were employed in the preparation, packing and shipment of prophylactic solution for the prevention of ophthalmia neonatorum, and paid out of appropriation for that purpose:

John C. Reynolds	$500 00
Margaret Bott	217 00
Ellen Slingerland	180 00
Bessie McComb	101 00
Grace McCollum	125 00
	$1,123 00

DETAILED STATEMENT OF EXPENDITURES FROM FUNDS APPROPRIATED FOR THE FOLLOWING:

Investigations

Expenses in connection with Annual Conference 1909, and printing proceedings of same.......	$1,869 27
Investigations of watersheds and public water supplies	2,607 22

Investigating registration of vital statistics, communicable diseases, etc		$2,382 68
Investigating public nuisances, etc		1,982 45
Expenses in connection with public hearings, stenographic services, etc., relating to establishment of proposed hospitals for tuberculosis patients		1,411 04
Investigating sanitary conditions of summer resorts		756 31
Investigations in connection with sewage disposal, etc.		610 00
Investigations in connection with eyesight and hearing of school children		559 96
Investigating efficiency of municipal water purification plants		42 60
		$12,221 53

Office Expenses

Printing:		
Publication of Monthly Bulletin	$3,693 00	
Envelopes for same	251 73	
Blank forms for registration of births and deaths	308 05	
General office printing	1,988 85	
		$6,241 63
Office supplies		859 35
Furniture and office furnishings		650 45
Telephone service		689 99
Telegraph and messenger service		324 47
Books and subscriptions		384 92
		$9,150 81

Office Expenses and Equipment Division of Engineering

Oak rack	$15 00
Book cases	25 75
Costumer	3 15

Curtains	$5 45
Microscope and micrometer	37 54
Typewriters	156 00
Steel tape measures	14 00
Map tubes	5 00
Sewage disposal model	352 15
Lithoprints and blueprints	20 77
Atlas	32 50
Other books and subscriptions	77 60
Office supplies	113 22
	$858 13

Antitoxin Laboratory

Microscope, glassware, etc	$1,446 65
Centrifuge	454 20
Refrigerating plant	1,145 00
Antitoxin syringes	297 50
Needles	221 57
Boxes	54 40
Camera, slides, etc	224 90
Mailing cases	374 78
General laboratory supplies	353 23
Envelopes	109 68
Printing	523 38
Postage	100 00
Books and subscriptions	57 55
Telephone service	67 08
Office supplies	29 60
Gas	46 20
Lumber	125 44
Painting and varnishing	607 25
Plumbing	136 63
Excavating and concrete work	84 55
Work on drain	15 40
Whitewashing	88 93
Oilcloth	10 00
Window shades	6 00

Repairs to wagon	$24 15
Repairs to sterilizer	7 50
Labor in stable	96 00
Cleaning laboratory	38 00
Brooms and brushes	9 23
Laundry work	18 94
Hay, straw and oats	2,394 33
Horses	125 00
Horse blankets	30 00
Guinea pigs	18 00
Meats and vegetables	352 48
Coal	240 50
Ice and water	54 45
	$9,888 50
Salaries	8,107 84
	$17,996 34

Hygienic Laboratory

Services of Bender Laboratory	$1,650 00
Constructing addition to laboratory	485 00
Extra lumber	8 18
Painting	52 00
Plumbing	77 99
Water bath	46 50
Labor and material fixing up branch laboratory at Ithaca	25 65
Ventilator, etc.	28 00
Platinum and petri dishes, water bottles, test tubes, etc.	707 95
Boxes for water bottles	234 00
General laboratory supplies	287 25
Expenses collecting samples of water	89 07
Water rent	49 25
Ice and water	90 30
Meat and vegetables	45 09
Gas	121 70

Telephone service	$21 67
Mailing cases	15 15
Tag envelopes	16 28
Printing	150 64
Photos	11 74
Laundry	4 88
Express, freight and cartage	33 40
Office expenses	5 10
Insurance on laboratory buildings	102 00
	$4,358 79
Salaries	5,638 35
	$9,997 14

Cancer Laboratory

Laboratory supplies	$1,823 67
Postage, express, freight, cartage, etc. (Sundry accounts rendered by Secretary)	548 07
General repairs — material and labor	594 35
Lumber	29 70
Painting	214 50
Refrigerating plant	1,650 00
Addition to ice machine	136 13
Tank for gas	30 00
Desk	75 00
Carpet	75 00
Matting	31 25
Mirror	2 00
Window screens	25 50
Shades	5 53
Safe	65 00
Rent of animal house	480 00
Guinea pigs and rabbits	21 87
Mice and rats	681 57
Water rent	58 50
Electric light	482 17
Gas	56 90

Coal	$856 42
Ice	10 56
Laundry	193 09
Telephone service	131 44
Telegraph service	11 63
Books and subscriptions	401 63
Printing	301 11
Traveling expenses	198 70
	$9,191 34
Salaries	11,194 64
	$20,385 98

Ophthalmia Neonatorum

Equipment — glass vials, droppers, nipples and other materials used in preparation of ophthalmia neonatorum outfits	$1,729 04
Services of employees engaged in making the prophylactic solution, bottling and packing same for shipment	1,123 00
Postage	950 00
Printing	272 74
Coal	136 50
Gas	111 60
Water rental	58 63
Telephone and telegraph	30 76
	$4,412 27

Postage and Transportation

Postage	$2,900 00
Transportation	2,083 48
	$4,983 48

Suppression of Communicable Diseases

Services of medical experts investigating outbreaks of communicable diseases, etc.	$5,130 00
Traveling expenses and printing — report cards, red cross shields, circulars of instructions to health officers, and for general household distribution	1,710 85
	$6,840 85

Marriage Licenses

Printing blank affidavits, marriage licenses, certificates of marriages, registers, index books, etc.	$3,000 00

Traveling Expenses

Monthly expenses of the Department investigating public water supplies, sewage disposal, public nuisances, registration of vital statistics, sanitary condition of summer resorts, etc., as follows:

October, 1909	$512 31
November, 1909	244 55
December, 1909	578 65
January, 1910	341 36
February, 1910	438 57
March, 1910	644 06
April, 1910	567 60
May, 1910	437 66
June, 1910	458 91
July, 1910	416 46
August, 1910	738 12
September, 1910	1,284 52
	$6,662 77
Commissioner	1,246 05
	$7,908 82

Tuberculosis Exhibition

Salaries of director, lecturers and laborers connected with the exhibition	$2,535 00
Traveling expenses of	2,059 38
Banners, mottoes, lumber and other necessary material for equipment	1,254 23
Express, freight and cartage	251 51
Rent of rooms for exhibition	156 50
Printing and advertising	140 70
	$6,397 32

RECAPITULATION

Total Expenditures During the Year out of Appropriations made for the Department

Division of administration, salaries		$13,960 00
Division of engineering:		
Salaries	$10,821 66	
Office expenses	858 13	
		11,679 79
Division of vital statistics, salaries		9,946 38
Division of communicable diseases, salaries		2,937 50
Antitoxin laboratory:		
Salaries	$8,107 84	
Sundries	9,888 50	
		17,996 34
Hygienic laboratory:		
Salaries	$5,638 35	
Sundries	4,358 79	
		9,997 14
Cancer laboratory:		
Salaries	$11,194 64	
Sundries	9,191 34	
		20,385 98

Investigations:		
Salaries	$6,045 90	
Miscellaneous	6,175 63	
		$12,221 53
Marriage license blanks		3,000 00
Office expenses		9,150 81
Postage and transportation		4,983 48
Prevention of ophthalmia neonatorum:		
Salaries	$1,123 00	
Miscellaneous	3,289 27	
		4,412 27
Suppression of smallpox and other communicable diseases:		
Salaries	$5,130 00	
Miscellaneous	1,710 85	
		6,840 85
Traveling expenses:		
General	$6,662 77	
Commissioner	1,246 05	
		7,908 82
Tuberculosis exhibition:		
Salaries	$2,535 00	
Miscellaneous	3,862 32	
		6,397 32
Unexpended balances for temporary employees		1,200 95
		$143,019 16

DIVISION

OF

VITAL STATISTICS

DIVISION OF VITAL STATISTICS

ALBANY, N. Y., *April* 15, 1911.

DR. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

SIR:— I have the honor to transmit herewith the Annual Report of the Division of Vital Statistics for the year 1910.

During the year the Department has kept the local registrars well supplied with registration blanks, and rendered all possible assistance in aiding the local boards in the enforcement of the registration laws.

Copies of sanitary regulations approved by the Department requiring compliance with the provisions of sections 22 and 23 of the Public Health Law were mailed to each of the local boards of health, together with an urgent request that the boards adopt and enforce the same.

Returns received from the local registrars have been checked up each month, and wherever it has come to the notice of the Department that defects existed in the local registration steps have been taken to correct such defects.

While this Department was obliged to serve formal notice upon fifty-two local boards of health to amend known defects in the local registration, as required by section 5 of the Public Health Law, but in three instances only was the Department compelled to take charge of the registration town of Bombay, Franklin county; village of Marlboro, Dutchess county and village of Avoca, Steuben county.

The living births reported to the Department for 1910 were 213,235 — 10,579 more than reported in 1909. There were 147,629 deaths reported, which is 7,368 more than reported in 1909.

The United States Census Bureau gives the population of the State, for July 1, 1910, 9,158,328, and the birth rate per 1,000 population is shown to be 23.3, while the death rate was 16.1. The urban death rate was 16.1; the rural 16.3. The urban birth rate was 25.3; the rural 17.4.

During 1910 there were 85,490 marriages reported in the State — about 5,400 more than occurred in 1909.

TABLE I

Total Registration in State Since 1885

The following table shows the total registration of births, deaths and marriages occurring in the State since 1885.

YEAR	Population	*Births	Deaths	Marriages	Birth rate	Death rate	Marriage rate
1885	5,609,910	63,536	80,407	24,409	11.3	14.3	4.4
1886	5,719,855	89,828	86,801	36,764	15.7	15.2	6.4
1887	5,831,947	102,038	108,269	44,438	17.5	18.6	7.6
1888	5,946,246	103,089	114,584	43,683	17.3	19.3	7.3
1889	6,062,764	114,804	113,155	50,960	18.8	18.6	8.4
1890	6,182,600	112,572	128,648	41,195	18.2	20.8	6.7
1891	6,316,333	125,909	129,850	51,458	19.9	20.5	8.1
1892	6,438,283	130,143	131,388	52,725	20.2	20.3	8.1
1893	6,537,716	136,297	129,659	52,805	20.8	19.7	8.1
1894	6,638,696	141,827	123,423	52,539	21.4	18.6	7.9
1895	6,741,246	142,311	128,834	59,059	21.1	19.1	8.7
1896	6,845,375	147,327	126,253	58,990	21.5	18.4	8.6
1897	6,951,111	144,631	118,525	57,530	20.8	17.1	8.3
1898	7,058,459	138,702	122,584	57,392	19.7	17.4	8.1
1899	7,167,491	136,778	121,831	61,167	19.1	17.0	8.5
1900	7,281,533	143,156	132,089	63,225	19.7	18.1	8.7
1901	7,434,896	140,539	131,335	65,216	18.9	17.7	8.8
1902	7,591,491	146,740	124,830	68,903	19.3	16.4	9.1
1903	7,751,375	158,343	127,498	73,011	20.4	16.4	9.4
1904	7,914,636	165,014	142,217	74,677	20.8	18.0	9.4
1905	8,081,333	172,259	137,435	78,261	21.3	17.0	9.7
1906	8,251,538	183,012	141,099	87,870	22.2	17.1	10.7
1907	8,425,333	196,020	147,130	92,421	23.3	17.5	11.0
1908	8,546,356	203,159	138,912	73,644	23.8	16.3	8.6
1909	8,699,643	202,656	140,261	80,090	23.3	16.1	9.2
1910	9,158,328	213,235	147,629	85,490	23.3	16.1	9.3

* Still births excluded.

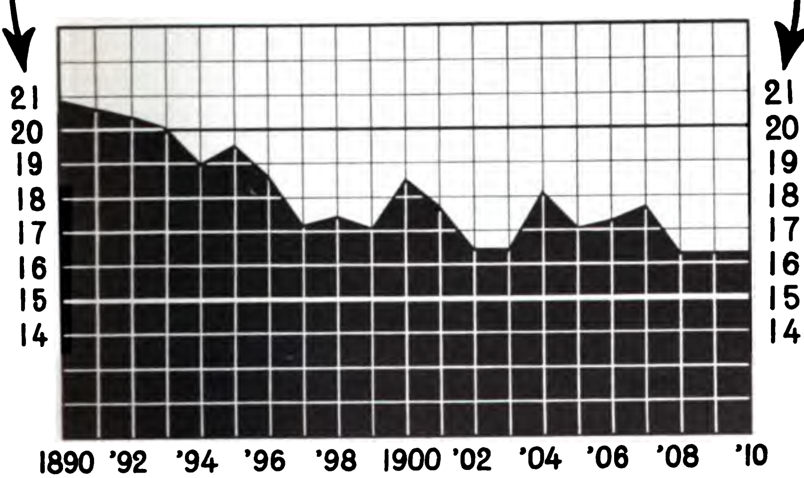
Registration of Deaths

While the registration of deaths has been more satisfactory during the past year than at any time previous in the history of the Department, we are still in receipt of delayed returns each month, and compelled to return a large number of certificates for the purpose of ascertaining a more satisfactory statement as to cause of death. During the year 2,021 defective death certificates were returned for correction.

The Department has recently mailed to each of the physicians practicing in the State outside of Greater New York a pamphlet pointing out defects in the registration of vital statistics, which, together with the "Pocket reference to the International List of Causes of Death" issued by the United States Census Bureau, and mailed to all of the physicians in the State would result in correcting existing defects if the physicians would familiarize

DIAGRAM SHOWING FLUCTUATIONS OF THE DEATH RATE PER THOUSAND

IN THE STATE OF NEW YORK SINCE 1890



themselves with the nature and purposes of the International list, and co-operate with the registration officials in giving the necessary information so that returns can be properly be classified.

The delayed certificates of death filed with the Department are from the rural districts, and in most instances the delay in making prompt reports is due to the local board of health failing to enforce the provisions of section 23 of the Public Health Law requiring undertakers to obtain burial permits before removing a corpse for burial. Occasionally it comes to the notice of the Department that such delays are due to the undertakers insisting upon the physicians filling out the complete record of death, instead of obtaining the family history of deceased themselves, which necessitates the physician driving several miles to obtain the information, and they abide their time in making such visits.

I believe that existing defects in the registration may be remedied by having section 22 of the Public Health Law amended requiring the attending physician to promptly fill out the medical certificate of death and deliver same to the undertaker or other person having charge of a corpse, and that they be required to obtain the family history and file the completed record of death with the local registrar of vital statistics within 24 hours after receiving same from the physician.

Undertakers could then be held to strict accountability for the filing of prompt returns of deaths, and can be more effectively dealt with than the many physicians practicing in the State.

Registration of Births

During the past year there has been a noticeable improvement in the registration of births, due to the short interval of registration and general attention given to the registration of births.

The amendment to section 22 of the Public Health Law requiring births to be reported within thirty-six hours after they occur at first met with considerable opposition on the part of the practicing physicians, not so much that it was impossible to report the cases within the time prescribed, but that it was a hardship and unreasonable to demand such exacting services of a physician. Of course in some of the rural districts it is difficult to strictly comply with the law, but most of the rural physicians are making

returns as quickly as possible. In the cities the law can be complied with, but there is some difficulty in getting the local boards of health to enforce the law, the belief being that a physician should be allowed a more reasonable time in which to file a complete record of the birth.

However upon looking over the certificates filed with the Department I find a great majority of the birth certificates are filled out on the day the birth occurred or the day following. Apparently it is not a question of time so much as it is lack of willingness on the part of certain physicians to file certificates within any reasonable time after a birth occurs, as I notice that most of the physicians who fail to promptly report births attended by them delay filing the records until weeks after the births occurred, when undoubtedly the local registrar has brought the matter to their attention.

I believe that should the law be amended allowing the physicians five days within which to file the complete record of birth, local boards of health failing to enforce strict compliance with the law as it now stands, would heartily co-operate with the State Department of Health in correcting existing defects in the registration.

A postal notification card could be prescribed by the Department to be furnished by the local boards of health in supplying physicians for use in making prompt reports of births as now required by law, thus retaining the thirty-six hour clause, and making it possible for the local boards of health to see that proper measures had been taken to prevent ophthalmia neonatorum by the use of a prophylactic solution, and allow the physician five days in which to file the complete record of the birth on the form prescribed by the State Department of Health. Such an amendment would at least leave the local boards of health without a reasonable excuse for failure to enforce the law.

The following shows the number of births occurring in 1910 reported to the Department, classified by months in which the births occurred:

TABLE II

MONTH	Total living births	White	Colored	TOTAL Male	Female	Not stated	Still births
January	18,589	18,355	234	9,620	8,969	......	856
February	16,108	15,889	219	8,200	7,906	2	805
March	18,711	18,402	309	9,592	9,116	3	925
April	17,343	17,104	239	8,845	8,495	3	828
May	17,590	17,343	247	9,046	8,541	3	847
June	17,596	17,384	212	9,055	8,538	3	840
July	18,893	18,664	229	9,699	9,194	......	816
August	18,123	17,906	217	9,143	8,975	5	818
September	17,910	17,675	235	9,243	8,665	2	794
October	17,679	17,458	221	8,998	8,677	4	786
November	17,353	17,101	252	8,869	8,483	1	803
December	17,340	17,034	306	8,904	8,433	3	834
Total	213,235	210,315	2,920	109,214	103,992	29	9,952

The 2,920 colored births were classified as follows: Negro, 2,874; Indian, 28; Mongolian, 18. Of the 213,235 living births 1,845 were premature.

Registration of Marriages

While the local registration of marriages under the marriage license law is satisfactory, the law should be amended so as to provide for the original records to be filed with the State Department of Health, instead of copies of the records filed with the county clerks.

Previous to the enactment of this law the Department received the original returns from all of the registration districts in the State, excepting the cities of Albany, Buffalo, Greater New York and Yonkers. The filing of returns from these cities with the Department has more than doubled the work formerly required in indexing the marriage certificates filed with the Department under the old law, and put the Department to the expense of providing additional steel filing cases to provide for copies of the original records.

The Department is not only required to furnish the town and city clerks with the necessary printed blanks to carry out the provisions of the marriage license law, but also required to furnish the county clerks with the necessary blanks for transcripts of same to be filed with the Department.

If the law could be amended so as to provide that the original

records outside of Greater New York should be filed with the State Department of Health, the State would save more than one-half of the expenses now incurred, and the counties the expense of providing the clerical help now necessary to make copies of the original records for filing with the Department, as well as the expense incurred in providing filing cases for the original records.

If the Department is to continue receiving the returns from the whole State it will be necessary for the Legislature to provide for the employment of two additional clerks in the division of vital statistics.

The following table shows the number of marriages reported in the State since 1907 — the year previous to the enactment of the marriage license law:

TABLE III

Marriages in New York State

COUNTY	1910	1909	1908	1907	COUNTY	1910	1909	1908	1907
Albany	1,386	1,301	1,209	1,331	Onondaga	1,586	1,419	1,296	1,423
Allegany	325	333	317	469	Ontario	391	352	329	419
Broome	859	726	691	1,461	Orange	889	783	727	1,008
Cattaraugus	618	580	594	1,021	Orleans	223	240	192	227
Cayuga	511	524	485	632	Oswego	532	551	471	571
Chautauqua	1,181	1,156	980	2,147	Otsego	349	338	324	438
Chemung	538	555	472	910	Putnam	110	97	114	145
Chenango	290	255	226	296	Queens	2,077	1,647	1,292	1,490
Clinton	408	419	350	499	Rensselaer	985	904	916	998
Columbia	315	288	254	371	Richmond	526	450	425	594
Cortland	230	215	195	231	Rockland	211	265	231	308
Delaware	378	371	355	395	St. Lawrence	682	685	584	884
Dutchess	575	540	538	782	Saratoga	412	399	369	553
Erie	4,728	4,330	3,917	5,375	Schenectady	705	577	574	775
Essex	281	255	216	300	Schoharie	152	147	155	196
Franklin	358	371	299	436	Schuyler	83	113	95	178
Fulton	387	386	341	411	Seneca	180	162	158	167
Genesee	254	272	272	271	Steuben	632	686	608	963
Greene	210	231	220	250	Suffolk	604	544	553	628
Hamilton	28	34	34	34	Sullivan	274	218	242	270
Herkimer	514	515	391	399	Tioga	249	239	238	502
Jefferson	620	629	571	891	Tompkins	274	240	233	310
Kings	12,451	12,714	11,664	12,916	Ulster	616	581	555	716
Lewis	175	195	152	178	Warren	275	275	254	358
Livingston	235	258	225	302	Washington	400	360	387	445
Madison	282	319	274	315	Wayne	387	375	336	458
Monroe	2,647	2,393	2,058	2,529	Westchester	2,369	2,055	1,848	2,650
Montgomery	596	563	532	506	Wyoming	230	228	226	298
Nassau	628	559	472	474	Yates	125	136	122	124
New York	*34,647	31,596	29,550	36,097					
Niagara	941	848	750	1,100	Total	85,490	80,090	73,644	92,421
Oneida	1,416	1,293	1,186	996					

* Licenses issued.

Registration of Births, Deaths and Marriages

The following table shows the number of births, deaths and marriages reported in the State during 1910, by counties:

TABLE IV

COUNTY	Population	Births	Deaths	Marriages
Albany	173,797	2,439	3,228	1,386
Allegany	41,341	769	622	325
Broome	79,043	1,389	1,331	859
Cattaraugus	65,919	1,208	901	618
Cayuga	67,138	1,121	999	511
Chautauqua	105,492	2,242	1,544	1,181
Chemung	54,751	862	866	538
Chenango	35,523	611	598	290
Clinton	48,221	1,129	676	408
Columbia	43,692	729	768	315
Cortland	29,244	558	528	230
Delaware	45,532	782	726	378
Dutchess	87,816	1,546	1,480	575
Erie	531,338	12,177	8,546	4,728
Essex	33,501	690	543	281
Franklin	45,668	1,051	822	358
Fulton	44,636	800	673	387
Genesee	37,690	686	590	254
Greene	30,181	542	527	210
Hamilton	4,350	70	56	28
Herkimer	56,472	1,209	867	514
Jefferson	80,392	1,485	1,352	620
Kings	1,646,285	42,708	25,676	12,451
Lewis	24,777	446	374	175
Livingston	38,068	664	541	235
Madison	39,281	725	619	282
Monroe	285,079	6,136	3,963	2,647
Montgomery	57,902	1,107	991	596
Nassau	84,554	1,780	1,133	628
New York	2,779,103	77,263	45,636	*34,647
Niagara	92,362	2,092	1,402	941
Oneida	154,741	3,425	2,562	1,416
Onondaga	201,243	3,782	3,057	1,586
Ontario	52,280	942	781	391
Orange	116,303	2,074	2,023	889
Orleans	32,026	562	500	223
Oswego	71,745	1,336	1,123	532
Otsego	47,182	779	847	349
Putnam	14,689	214	267	110
Queens	287,725	7,119	3,971	2,077
Rensselaer	122,295	1,615	2,283	985
Richmond	86,526	1,991	1,467	526
Rockland	46,957	797	668	211
St. Lawrence	88,903	1,716	1,351	682
Saratoga	61,900	1,131	1,081	412
Schenectady	88,966	2,103	1,249	705
Schoharie	23,797	329	395	152
Schuyler	13,961	216	215	83
Seneca	26,952	412	412	180
Steuben	83,382	1,367	1,221	632

*Licenses issued.

TABLE IV — (*Concluded*)

COUNTY	Population	Births	Deaths	Marriages
Suffolk	96,489	1,676	1,403	604
Sullivan	33,773	615	671	224
Tioga	25,576	387	404	249
Tompkins	33,633	554	548	274
Ulster	91,989	1,516	1,459	616
Warren	32,241	538	456	275
Washington	47,802	853	796	400
Wayne	50,233	884	766	387
Westchester	285,350	6,559	4,335	2,369
Wyoming	31,907	514	468	230
Yates	18,614	268	280	125
State Institutions	....	....	1,992	....
Totals	9,158,328	213,290	147,629	85,490

Deaths in State Institutions

NAME OF INSTITUTION AND LOCATION	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Auburn State Prison, Auburn	3	1	...	1	1	...	2	1	...	...	1	...	10
Binghamton State Hospital, Binghamton	9	15	11	9	8	21	12	13	8	10	10	13	139
Bloomingdale Asylum, White Plains	2	...	4	...	3	...	2	3	3	2	3	3	25
Craig Colony Sonyea*	10	14	11	7	8	4	4	9	8	3	7	12	97
Dannemora State Hospital, Dannemora	1	1	1	...	4	1	3	1	2	2	3	2	21
Elmira State Reformatory, Elmira	1	...	...	1	...	...	...	1	...	1	...	...	4
Gowanda State Hospital, Gowanda	4	3	9	9	8	4	6	6	3	3	6	8	69
Hudson River State Hospital, Poughkeepsie	26	20	30	28	22	21	18	13	21	26	23	34	282
Long Island State Hospital, Kings Park	26	21	25	18	23	27	32	21	22	25	27	39	306
Manhattan State Hospital, Central Islip	25	26	30	38	37	41	48	41	29	36	46	45	442
Matteawan State Hospital, Matteawan	...	2	...	1	3	5	1	1	1	1	2	1	18
Middletown State Hospital, Middletown	12	7	17	9	9	1	8	6	8	4	10	7	98
State Soldiers and Sailors' Home, Bath	12	21	28	24	21	12	29	21	14	17	18	9	226
Rochester State Hospital, Rochester	17	14	16	8	10	6	12	13	14	8	13	10	141
Rome Custodial Asylum, Rome	3	5	4	11	3	3	1	2	1	8	6	2	49
St. Lawrence State Hospital, Ogdensburg	12	12	16	11	14	9	10	8	3	11	9	12	127
Sing Sing Prison, Ossining	2	3	1	...	1	...	2	2	...	...	...	...	11
Utica State Hospital, Utica	8	7	15	15	13	3	8	8	6	10	6	12	111
Willard State Hospital:	24	16	21	10	9	19	12	19	9	17	16	21	193
Romulus	13	6	7	7	8	11	9	12	2	9	7	11	102
Ovid	11	10	14	3	1	8	3	7	7	8	9	10	91
Total	197	188	239	200	197	177	210	189	152	184	206	230	†2,369

* Town of Groveland.

† This total is greater than that given in the classification of causes of death, p.   , for the reason that previous to March these deaths were classified for the Bulletin under the county in which institution is located.

City Registration

The following table shows the total registration of births and deaths in cities of the State; births and death rates for 1910, and the average rates for the previous five years based upon the United States Census Bureau estimated populations:

TABLE V

CITY	Population 1910 Census	Births	Deaths	Rate per 1,000 Population		Average Rate Past 5 Years	
				Births	Deaths	Births	Deaths
City of New York	4,799,639	129,081	76,750	26.9	16.0	27.5	17.7
Borough Manhattan	2,341,312	66,358	38,668	28.3	16.1	28.7	17.7
Borough Bronx	437,791	10,905	6,968	24.9	15.9	27.4	20.4
Borough Brooklyn	1,646,285	42,708	25,676	25.1	15.6	26.0	17.1
Borough Queens	287,725	7,119	3,971	24.8	13.8	25.6	16.5
Borough Richmond	86,526	1,991	1,467	23.0	17.0	25.5	19.9
Buffalo	425,715	10,008	6,877	23.5	16.2	22.4	15.7
Rochester	219,693	4,999	3,084	22.8	14.0	21.4	15.0
Syracuse	138,087	2,797	2,124	20.3	15.4	18.9	15.8
Albany	100,358	1,369	1,943	13.6	19.4	11.5	18.1
Yonkers	80,589	2,064	1,226	25.6	15.2	24.9	16.1
Troy	76,836	956	1,597	12.4	20.8	12.1	20.4
Utica	74,879	1,902	1,297	25.4	17.3	23.6	18.2
Schenectady	73,450	1,817	1,070	24.7	14.6	25.6	13.0
Binghamton	48,671	908	765	18.7	15.7	18.5	16.0
Elmira	37,238	594	554	16.0	14.9	16.0	15.5
Auburn	34,760	645	522	18.6	15.0	19.6	15.8
Amsterdam	31,586	695	540	22.0	17.1	22.8	16.5
Jamestown	31,523	659	404	20.9	12.8	20.5	11.4
Mt. Vernon	31,175	706	433	22.6	13.9	24.3	14.5
Niagara Falls	30,617	811	551	26.5	18.0	20.3	15.6
New Rochelle	29,229	753	342	25.8	11.7	26.6	13.0
Poughkeepsie	28,055	570	466	20.3	16.6	21.1	18.4
Newburgh	27,868	536	510	19.2	18.3	18.3	18.3
Watertown	26,792	620	468	23.1	17.5	18.5	16.3
Kingston	25,929	431	475	16.6	18.3	21.6	18.5
Cohoes	24,737	438	509	17.7	20.6	18.9	19.9
Oswego	23,410	488	385	20.8	16.4	19.3	16.4
Gloversville	20,730	401	321	19.3	15.5	18.0	15.6
Rome	20,632	571	411	27.7	19.9	23.3	19.9
Lockport	17,993	342	299	19.0	16.6	18.5	14.6
Dunkirk	17,308	566	279	32.7	16.6	33.9	11.2
Ogdensburg	15,981	348	268	21.8	16.8	22.8	18.4
Middletown	15,297	266	275	17.3	18.0	15.2	16.4
Glens Falls	15,268	290	241	19.0	15.7	15.7	11.9
Watervliet	15,099	210	261	13.9	17.3	14.0	17.4
Ithaca	14,815	237	244	16.0	16.5	15.6	14.8
Olean	14,814	328	188	22.1	12.7	20.8	12.9
Lackawanna	14,549	389	397	26.7	27.3	....	.....
Corning	13,742	268	200	19.5	14.6	17.9	15.9
Hornell	13,637	233	174	17.1	12.8	19.2	14.1
Geneva	12,438	235	175	18.9	14.0	19.4	13.6
Little Falls	12,326	335	194	27.2	15.7	20.1	13.7
North Tonawanda	12,033	332	160	27.6	13.3	27.0	13.9
Cortland	11,517	264	219	22.9	19.0	16.3	12.8
Hudson	11,462	254	236	22.2	20.6	17.2	17.8
Plattsburgh	11,182	284	195	25.4	17.4	20.9	14.5
Rensselaer	10,712	167	158	15.6	14.7	14.0	14.4
Fulton	10,550	242	155	22.9	14.7	19.9	14.9
Johnstown	10,476	177	143	16.9	13.7	16.6	14.3
Oneonta	9,552	190	181	19.9	18.9	17.1	17.5
Port Jervis	9,304	166	170	17.8	18.3	17.5	17.9
Oneida	8,316	157	118	18.9	14.2	17.5	14.7
Tonawanda	8,308	168	106	20.2	12.8	19.4	12.8
Total urban	6,768,877	171,267	108,660	25.3	16.1	25.5	17.3
Rural	2,389,451	41,968	38,969	17.6	16.3	15.9	15.4

The above table includes deaths of nonresidents occurring in the cities, except in the following cities, where deaths occurring in State institutions are excluded: Auburn, State Prison, Bing-

hamton, State Hospital, Elmira, Reformatory, Middletown, State Hospital, Ogdensburg, St Lawrence State Hospital, Rome, State Custodial Asylum, Utica, State Hospital.

Average city death rate, 1910 .... 15.3
Average city birth rate 20.3

The average city birth rate was 25.3, and the rural 16.1. The cities having the highest birth rate were: Dunkirk, 32.7; Rome, 27.7; North Tonawanda, 27.6; Little Falls, 27.2; Greater New York, 26.9; Lackawanna, 26.7; Niagara Falls, 26.5 and New Rochelle, 25.8.

The lowest birth rate is shown in the following cities, due to incomplete registration: Troy, 12.4; Albany, 13.6; Watervliet, 13.9 and Rensselaer, 15.6. Troy reports 641 more deaths than births; Albany, 576; Watervliet, 51 and Rensselaer, 9. Other cities reporting less births than deaths were Cohoes, 71; Cortland, 45; Ithaca, 7; Kingston, 44; Lackawanna, 8; Middletown, 9 and Port Jervis 4.

The cities having the highest death rate were Lackawanna, 27.3; Troy, 20.8; Hudson, 20.6; Cohoes, 20.6 and Rome, 19.9.

New Rochelle has the lowest death rate, 11.7; and the following cities show a reported death rate of 14.0 and under; Rochester and Geneva, 14.0; Mt. Vernon, 13.9; Johnstown, 13.7; North Tonawanda, 13.3; Olean, 12.7; Jamestown, Hornell and Tonawanda, 12.8; New Rochelle, 11.7.

Of the largest cities in the State, Rochester shows the lowest death rate, 14.0. Of the smaller cities, Geneva has a like rate.

The following tables shows the total registration in each of the registration districts in the State:

Albany County

	Births 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Albany, city	1,369	1,943	824	Knox, town	10	13	17
Altamont, village	11	14	.....	New Scotland, town	40	43	17
Berne, town	24	34	15	Rensselaerville, town	25	23	11
Bethlehem, town	47	64	13	Voorheesville, village	5	10	.....
Coeymans, town	89	55	21	Watervliet, city	209	260	131
Cohoes, city	413	508	231	Westerlo, town	19	28	8
Colonie, town	82	118	49	Delayed returns	9	2	6
Green Island, town*	....	.....	33				
Green Island, village	76	72	.....	Total	2,448	3,221	1,392
Guilderland, town	20	34	16				

* Town and village have same boundaries.

Allegany County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Alfred, town	18	11	12	Cuba, village	43	33	.....
Alfred, village	13	20	.....	Friendship, town	18	23	17
Allen, town	10	11	3	Friendship, village	11	27	.....
Alma, town	20	10	5	Genesee, town	9	9	14
Almond, town	22	27	10	Granger, town	13	13	2
Amity, town	26	10	19	Grove, town	16	3	1
Andover, town	21	15	18	Hume, town	36	19	10
Andover, village	18	14	.....	Independence, town	23	14	11
Angelica, town	15	15	9	New Hudson, town	17	13	7
Angelica, village	14	23	.....	Richburg, village	5	1	.....
Belfast, town	29	27	15	Rushford, town	30	17	7
Belfast, village	....	.....	.....	Scio, town	21	20	8
Belmont, village	18	24	.....	Ward, town	6	3	2
Birdsall, town	9	7	3	Wellsville, town	24	12	63
Bolivar, town	27	11	22	Wellsville, village	76	65	.....
Bolivar, village	14	11	.....	West Almond, town	6	7	7
Burns, town	9	12	7	Willing, town	13	11	8
Canaseraga, village	10	18	.....	Wirt, town	26	8	8
Caneadea, town	22	21	6	Delayed returns	3	1	3
Centerville, town	21	9	6				
Clarksville, town	23	8	5	Total	772	619	328
Cuba, town	17	16	20				

Broome County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Barker, town	20	12	13	Maine, town	23	20	17
Binghamton, town	12	12	3	Nanticoke, town	14	7	6
Binghamton, city	905	765	536	Port Dickinson, village	4	8	.....
Chenango, town	13	15	9	Sanford, town	34	27	24
Colesville, town	26	38	15	Triangle, town	14	12	9
Conklin, town	20	19	3	Union, town	28	23	92
Deposit, village	25	43	.....	Union, village	33	39	.....
Dickinson, town	7	44	9	Vestal, town	18	30	13
Endicott, village	53	27	.....	Whitney's Point, vil.	9	13	.....
Fenton, town	19	19	7	Windsor, town	26	24	29
Kirkwood, town	9	12	7	Windsor, village	5	7	.....
Lestershire, village	49	62	.....	Delayed returns	10	.....	.....
Lisle, town	19	17	15				
Lisle, village	4	9	.....	Total	1,399	1,304	807

Cattaraugus County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Allegany, town	52	28	31	Ellicottville, village	10	16	.....
Allegany, village	20	20	.....	Farmersville, town	14	11	5
Ashford, town	38	22	15	Franklinville, town	33	14	28
Carrollton, town	4	8	43	Franklinville, village	32	28	.....
Cattaraugus, village	16	20	.....	Freedom, town	21	13	5
Cold Spring, town	11	9	5	Gowanda, village	27	21	.....
Conewango, town	11	14	6	Great Valley, town	25	29	11
Dayton, town	23	18	15	Hinsdale, town	19	20	3
East Otto, town	25	9	7	Humphrey, town	15	9	7
East Randolph, village	6	22	.....	Ischua, town	13	11	4
Elko, town	8	6	4	Leon, town	12	10	5
Ellicottville, town	16	11	16	Limestone, village	19	7	.....

Cattaraugus County — Continued

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Little Valley, town	4	4	29	Portville, town	35	19	26
Little Valley, village	16	18	.....	Portville, village	7	8	......
Lyndon, town	5	5	3	Randolph, town	12	16	19
Machias, town	25	35	7	Randolph, village	23	14	......
Mansfield, town	10	10	4	Red House, town	9	4	10
Napoli, town	15	11	2	Salamanca, town	3	9	62
New Albion, town	14	11	17	Salamanca, village	142	85	......
Olean, town	7	11	5	South Valley, town	10	8	3
Olean, city	328	188	174	West Salamanca, vil.	6	18	......
Otto, town	15	13	6	Yorkshire, town	25	32	17
Perrysburg, town	18	12	8	Delayed returns	3	2	......
Persia, town	6	4	16				
				Total	1,211	913	618

Cayuga County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Auburn, city	646	521	302	Moravia, village	19	19	......
Aurelius, town	11	10	10	Niles, town	21	14	6
Aurora, village	3	2	.....	Owasco, town	17	9	10
Brutus, town	24	17	14	Port Byron, village	16	16	......
Cato, town	18	10	11	Scipio, town	23	20	4
Cato, village	2	5	.....	Sempronius, town	10	14	10
Cayuga, village	5	7	.....	Sennett, town	24	31	9
Conquest, town	16	26	9	Springport, town	9	6	3
Fair Haven, village	9	7	.....	Sterling, town	25	40	20
Fleming, town	17	10	4	Summer Hill, town	13	5	2
Genoa, town	19	25	0	Throop, town	11	6	3
Ira, town	9	13	9	Union Springs, village	5	20	......
Ledyard, town	26	19	15	Venice, town	11	19	6
Locke, town	10	18	8	Victory, town	21	21	13
Mentz, town	19	11	13	Weedsport, village	18	29	......
Meridian, village	4	6	.....	Delayed returns	9	.....	1
Montezuma, town	18	11	8				
Moravia, town	22	8	14	Total	1,130	995	504

Chautauqua County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Arkwright, town	16	7	6	Ellicott, town	24	25	48
Brocton, village	17	12	.....	Ellington, town	17	19	7
Busti, town	27	24	8	Falconer, village	42	19	......
Carroll, town	33	29	10	Forestville, village	16	15	......
Celoron, village	15	12	.....	Fredonia, village	132	78	......
Charlotte, town	16	9	8	French creek, town	18	10	7
Chautauqua, town	27	59	78	Gerry, town	17	16	......
Chautauqua Lake Association, village*	7	12	.....	Hanover, town	46	45	51
				Harmony, town	34	35	4
Cherry creek, town	13	4	15	Jamestown, city	660	404	492
Cherry creek, village	9	10	.....	Kiantone, town	12	4	......
Clymer, town	19	26	16	Lakewood, village	9	15	......
Dunkirk, town	11	7	.....	Mayville, village	17	11	......
Dunkirk, city	553	272	186	Mina, town	11	8	6
Ellery, town	33	19	10	Panama, village	3	8	......

* Population included in that of the town of Chautauqua.

Chautauqua County — Continued

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Poland, town	29	15	7	Sinclairville, village	8	11	.....
Pomfret, town	38	22	47	Stockton, town	29	35	6
Portland, town	42	25	13	Villenova, town	28	14	8
Ripley, town	43	28	58	Westfield, town	15	22	71
Sheridan, town	24	27	9	Westfield, village	44	64	.....
Sherman, town	25	16	10	Delayed returns	55	3	2
Sherman, village	11	6	.....				
Silver Creek, village	52	34	.....	Total	2,297	1,536	1,183

Chemung County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Ashland, town	3	1	8	Horseheads, town	21	44	39
Baldwin, town	5	10	5	Horseheads, village	24	25	.....
Big Flats, town	20	19	18	Southport, town	24	27	17
Catlin, town	17	10	5	Van Etten, town	18	7	9
Chemung, town	24	27	16	Van Etten, village	8	6	.....
Elmira, town	12	39	6	Veteran, town	18	30	15
Elmira, city	593	554	388	Wellsburg, village	11	8	.....
Elmira Heights, village*	49	41	.....				
Erin, town	15	18	12	Total	862	866	538

* Part of village in town of Horseheads.

Chenango County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Afton, town	26	18	11	Norwich, village	153	122	.....
Afton, village	11	12	.....	Otselic, town	12	17	10
Bainbridge, town	12	7	21	Oxford, town	30	43	20
Bainbridge, village	24	24	.....	Oxford, village	35	32	.....
Columbus, town	17	14	6	Pharsalia, town	9	9	4
Coventry, town	7	16	4	Pitcher, town	18	12	4
German, town	10	2	2	Plymouth, town	7	9	6
Greene, town	33	28	30	Preston, town	10	17	6
Greene, village	20	18	.....	Sherburne, town	19	25	23
Guilford, town	31	37	18	Sherburne, village	15	16	.....
Lincklaen, town	13	4	3	Smithville, town	17	11	6
McDonough, town	16	17	4	Smyrna, town	15	11	9
New Berlin, town	9	18	19	Smyrna, village	4	7	.....
New Berlin, village	16	22	.....	Delayed returns	1	.....	4
North Norwich, town	12	14	2				
Norwich, town	10	11	68	Total	612	593	280

Clinton County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Altona, town	46	21	10	Mooers, town	57	54	30
Ausable, town	18	12	22	Mooers, village	9	7	......
Beekmantown, town	25	39	11	Peru, town	48	27	16
Black Brook, town	30	23	15	Plattsburgh, town	51	50	18
Champlain, town	75	37	55	Plattsburgh, city	284	192	134
Champlain, village	27	19	.....	Rouse's Point, village	5	7	......
Chazy, town	109	37	18	Saranac, town	91	46	28
Clinton, town	49	24	7	Schuyler Falls, town	45	22	7
Dannemora, town	63	20	18	Delayed returns	11	3	......
Dannemora, village	25	9	.....				
Ellenburgh, town	72	14	19	Total	1,140	663	408

Columbia County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Ancram, town	31	17	9	Hudson, city	254	236	66
Austerlitz, town	10	10	8	Kinderhook, town	8	21	23
Canaan, town	11	14	12	Kinderhook, village	19	17	......
Chatham, town	23	38	31	Livingston, town	22	20	10
Chatham, village	44	37	.....	New Lebanon, town	17	19	8
Claverack, town	30	38	32	Philmont, village	32	32	......
Clermont, town	14	20	6	Stockport, town	42	47	15
Copake, town	20	25	6	Stuyvesant, town	33	25	18
Gallatin, town	6	8	5	Taghkanic, town	12	11	5
Germantown, town	21	22	7	Valatie, village	24	27	......
Ghent, town	15	47	17	Delayed returns	3	2	......
Greenport, town	30	15	5				
Hillsdale, town	11	22	7	Total	732	770	290

Cortland County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Cincinnatus, town	18	14	5	Marathon, village	22	19	......
Cortland, city	264	218	95	Preble, town	14	11	1
Cortlandville, town	26	40	26	Scott, town	17	15	4
Cuyler, town	15	16	6	Solon, town	10	11	3
Freetown, town	7	7	4	Taylor, town	17	10	6
Harford, town	8	11	3	Truxton, town	22	18	10
Homer, town	22	25	25	Virgil, town	18	22	8
Homer, village	42	47	.....	Willet, town	5	12	6
Lapeer, town	11	8	0	Delayed returns	1	.....	1
McGrawville, village	10	20	.....				
Marathon, town	10	4	11	Total	559	528	214

Delaware County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Andes, town	18	31	13	Margaretville, village	19	12	......
Andes, village	7	10	.....	Masonville, town	17	13	6
Bovina, town	17	11	8	Meredith, town	19	19	7
Colchester, town	59	45	29	Middletown, town	56	64	33
Davenport, town	24	26	11	Roxbury, town	31	35	15
Delhi, town	17	20	19	Sidney, town	24	24	37
Delhi, village	29	25	.....	Sidney, village	43	48	......
Deposit, town	15	8	19	Stamford, town	14	12	23
Franklin, town	30	31	17	Stamford, village	12	21	......
Franklin, village	2	16	.....	Tompkins, town	44	26	14
Hamden, town	28	21	9	Walton, town	60	27	39
Hancock, town	82	47	52	Walton, village	50	61	......
Hancock, village	17	18	.....	Delayed returns	11	1	......
Harpersfield, town	20	13	6				
Hobart, village	7	15	.....	Total	793	720	367
Kortright, town	21	20	10				

Dutchess County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Amenia, town	30	30	7	Pleasant Valley, town	14	20	8
Beekman, town	16	14	8	Pleasant Valley, village	6	14	......
Clinton, town	18	20	5	Poughkeepsie, town	69	68	24
Dover, town	38	37	1	Poughkeepsie, city	563	468	230
East Fishkill, town	39	24	0	Red Hook, town	25	21	19
Fishkill, town	73	47	105	Red Hook, village	13	13	......
Fishkill, village	10	10	.....	Rhinebeck, town	25	36	11
Fishkill Landing, village	98	66	.....	Rhinebeck, village	34	29	......
Hyde Park, town	43	41	15	Stanford, town	27	35	12
La Grange, town	20	15	6	Tivoli, village	14	17	......
Matteawan, village	109	122	.....	Union Vale, town	16	11	3
Milan, town	12	13	8	Wappinger, town	30	30	27
Millbrook, village	33	20	.....	Wappingers Falls, village	47	50	......
Millerton, village	7	18	.....				
North East, town	20	26	33	Washington, town	28	48	14
Pawling, town	21	22	13	Delayed returns	7	1	3
Pawling, village	13	19	.....				
Pine Plains, town	35	24	11	Total	1,553	1,429	563

Erie County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Akron, village	36	26	.....	Collins, town	32	31	8
Alden, town	34	33	18	Concord, town	43	21	36
Alden, village	19	15	.....	Depew, village	174	84	......
Amherst, town	65	46	.....	East Aurora, village	47	43	......
Angola, village	23	20	.....	East Hamburg, town	49	28	16
Aurora, town	35	25	31	Eden, town	54	37	15
Blasdell, village	28	12	.....	Elma, town	31	26	14
Boston, town	28	16	9	Evans, town	33	34	27
Brant, town	43	22	20	Farnham, village	22	12	......
Buffalo, city	10,008	6,877	3,814	Grand Island, town	15	16	5
Cheektowaga, town	82	104	63	Hamburg, town	71	45	47
Clarence, town	52	37	15	Hamburg, village	40	30	......
Colden, town	21	16	7	Holland, town	33	16	10

Erie County — Continued

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Kenmore, village	18	6	.....	Springville, village	32	32	......
Lackawanna, city	389	395	134	Tonawanda, town	8	21	37
Lancaster, town	46	34	95	Tonawanda, city	164	106	69
Lancaster, village	100	62	.....	Wales, town	14	14	7
Marilla, town	28	23	8	West Seneca, town	97	65	34
Newstead, town	41	30	27	Williamsville, village	16	18	......
North Collins, town	47	28	15	Delayed returns	13	.....	152
Sardinia, town	38	21	12				
Sloan, village	21	7	.....	Total	12,190	8,534	4,745

Essex County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Bloomingdale, village	2	1	.....	North Elba, town	14	17	34
Chesterfield, town	25	18	15	North Hudson, town	6	8	1
Crown Point, town	19	35	9	Port Henry, village	74	35	......
Elizabethtown, town	13	11	16	St. Armand, town	2	9	6
Elizabethtown, village	10	8	.....	Schroon, town	19	15	9
Essex, town	11	25	4	Ticonderoga, town	75	46	46
Jay, town	46	31	15	Ticonderoga, village	37	17	......
Keene, town	12	13	13	Westport, town	43	32	......
Keeseville, village	25	34	.....	Willsboro, town	28	24	11
Lake Placid, village	32	21	.....	Wilmington, town	13	18	6
Lewis, town	14	17	9	Delayed returns	6	2	......
Minerva, town	13	11	3				
Moriah, town	151	108	78	Total	696	558	277
Newcomb, town	6	2	2				

Franklin County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Altamont, town	42	20	39	Franklin, town	25	22	8
Bangor, town	40	31	11	Harrietstown, town	10	13	56
Belmont, town	65	26	15	Malone, town	64	74	90
Bombay, town	28	35	12	Malone, village	141	108	......
Brandon, town	27	9	9	Moira, town	45	44	18
Brighton, town	22	16	6	Santa Clara, town	10	2	0
Burke, town	44	23	5	Saranac Lake, village	†112	141	......
Chateaugay, town	56	25	23	Tupper Lake, village	85	50	......
Chateaugay, village	10	24	.....	Waverly, town	64	39	15
Constable, town	30	32	13	Westville, town	30	18	5
Dickinson, town	39	24	8	Delayed returns	42	1	......
Duane, town	11	3	.....				
Fort Covington, town	38	18	25	Total	1,093	812	358
Fort Covington, village	13	14	.....				

† Part of village in Essex county.

Fulton County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Bleecker, town	12	6	0	Northampton, town	21	15	0
Broadalbin, town	25	29	12	Northville, village	21	9	.....
Caroga, town	13	11	1	Oppenheim, town	6	14	7
Ephratah, town	15	29	8	Perth, town	14	8	2
Gloversville, city	401	321	217	Stratford, town	12	13	1
Johnstown, town	38	39	16	Delayed returns	12	.....	4
Johnstown, city	188	153	110				
Mayfield, town	28	23	13	Total	812	681	391
Mayfield, village	6	11	.....				

Genesee County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Alabama, town	41	31	14	Elba, village	9	5	.....
Alexander, town	16	22	7	Le Roy, town	34	24	36
Alexander, village	3	6	.....	Le Roy, village	77	45	.....
Batavia, town	18	30	114	Oakfield, town	25	8	14
Batavia, village	232	206	.....	Oakfield, village	42	9	.....
Bergen, town	17	13	7	Pavilion, town	31	26	10
Bergen, village	12	21	.....	Pembroke, town	25	35	10
Bethany, town	18	30	14	Stafford, town	6	22	2
Byron, town	24	22	11	Delayed returns	13	.....	1
Corfu, village	10	7	.....				
Darien, town	30	19	11	Total	699	587	255
Elba, town	16	6	4				

Greene County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Ashland, town	8	8	0	Hunter, town	35	28	18
Athens, town	11	15	15	Hunter, village	8	8	.....
Athens, village	31	26	.....	Jewett, town	12	7	6
Cairo, town	31	39	8	Lexington, town	8	11	7
Catskill, town	61	68	76	New Baltimore, town	31	33	9
Catskill, village	93	96	.....	Prattsville, town	21	14	6
Coxsackie, town	33	17	27	Tannersville, village	15	10	.....
Coxsackie, village	63	56	.....	Windham, town	28	29	12
Durham, town	16	32	9	Delayed returns	3	.....	.....
Greenville, town	30	24	13				
Halcott, town	7	4	4	Total	545	525	210

Hamilton County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Arietta, town	4	4	1	Long Lake, town	13	10	7
Benson, town	4	3	0	Morehouse, town	0	0	0
Hope, town	4	1	5	Wells, town	12	15	7
Indian Lake, town	24	8	8				
Inlet, town	5	5	0	Total	70	57	28
Lake Pleasant, town	4	11	0				

Herkimer County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Cold Brook, village	4	5	.....	Newport, village	10	10	.....
Columbia, town	20	26	4	Norway, town	7	9	.....
Danube, town	16	8	6	Ohio, town	3	4	2
Dolgeville, village	63	19	.....	Old Forge, village	16	10	.....
Fairfield, town	16	6	6	Poland, village	....	11	.....
Frankfort, town	30	25	41	Russia, town	18	27	10
Frankfort, village	119	57	.....	Salisbury, town	38	25	18
German Flats, town	18	18	67	Schuyler, town	14	10	11
Herkimer, town	18	34	84	Stark, town	13	19	4
Herkimer, village	195	121	.....	Warren, town	6	17	4
Ilion, village	131	87	.....	Webb, town	19	8	8
Litchfield, town	9	11	1	West Winfield, village	16	14	.....
Little Falls, town	4	9	3	Wilmurt, town	7	7	0
Little Falls, city	336	188	200	Winfield, town	14	13	5
Manheim, town	5	4	25	Delayed returns	9	2	5
Middleville, village	5	11	.....				
Mohawk, village	30	36	.....	Total	1,218	857	519
Newport, town	9	6	15				

Jefferson County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Adams, town	22	39	25	Hounsfield, town	23	21	31
Adams, village	16	30	.....	Le Ray, town	23	44	10
Alexandria, town	46	39	30	Lorraine, town	19	18	8
Alexandria, Bay, village	44	29	.....	Lyme, town	10	20	8
Antwerp, town	44	27	19	Mannsville, village	1	9	.....
Antwerp, village	15	13	.....	Orleans, town	48	34	16
Belleville, village	6	8	.....	Pamelia, town	7	25	8
Black River, village	18	11	.....	Philadelphia, town	15	12	6
Brownville, town	19	18	30	Philadelphia, village	9	23	.....
Brownville, village	18	10	.....	Rodman, town	28	18	6
Cape Vincent, town	19	22	22	Rutland, town	13	21	16
Cape Vincent, village	22	15	.....	Sacketts Harbor, vil.	11	17	.....
Carthage, village	90	57	.....	Theresa, town	29	15	17
Champion, town	15	11	16	Theresa, village	9	24	.....
Chaumont, village	4	9	.....	Watertown, town	14	11	7
Clayton, town	35	30	33	Watertown, city	583	467	231
Clayton, village	39	27	.....	West Carthage, village	15	25	.....
Dexter, village	19	11	.....	Wilna, town	20	46	49
Ellisburg, town	65	52	18	Worth, town	12	5	4
Ellisburg, village	5	5	.....	Delayed returns	25	1	1
Glen Park, village	8	12	.....				
Henderson, town	22	16	10	Total	1,510	1,353	621
Henderson, village	5	6	.....				

Lewis County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Constableville, village	4	5	.....	Harrisville, village	10	14	.....
Copenhagen, village	4	22	.....	Highmarket, town	7	4	1
Croghan, town	47	23	26	Lewis, town	17	12	6
Croghan, village	16	13	.....	Leyden, town	28	14	13
Denmark, town	21	18	15	Lowville, town	18	21	34
Diana, town	24	25	13	Lowville, village	37	47	.....
Greig, town	12	8	7	Lyonsdale, town	22	13	3
Harrisburg, town	6	9	3	Lyons Falls, village	15	6	.....

Lewis County — Continued

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Martinsburg, town	28	26	14	Turin, village	2	3	.....
Montague, town	8	5	1	Watson, town	17	22	10
New Bremen, town	30	15	6	West Turin, town	15	12	9
Osceola, town	11	3	.....	Delayed returns	11	.....	.....
Pinckney, town	11	8	5				
Port Leyden, village	22	18	.....	Total	457	373	175
Turin, town	14	7	9				

Livingston County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Avon, town	22	19	19	Mount Morris, town	23	13	18
Avon, village	41	32	.....	Mount Morris, village	62	65	.....
Caledonia, town	20	18	16	North Dansville, town	5	6	38
Caledonia, village	18	21	.....	Nunda, town	21	22	12
Conesus, town	22	13	11	Nunda, village	12	20	.....
Dansville, village	59	75	.....	Ossian, town	12	6	3
Geneseo, town	17	20	23	Portage, town	23	9	8
Geneseo, village	41	22	.....	Sparta, town	5	7	9
Groveland, town	27	12	15	Springwater, town	26	16	17
Leicester, town	42	15	2	West Sparta, town	20	9	3
Lima, town	25	13	12	York, town	48	40	13
Lima, village	11	19	.....	Delayed returns	7	3	16
Livonia, town	41	15	16				
Livonia, village	13	16	.....	Total	671	528	251
Moscow, village	8	2	.....				

Madison County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Brookfield, town	39	30	14	Lenox, town	23	18	39
Brookfield, village	8	5	.....	Lincoln, town	17	10	6
Canastota, village	81	62	.....	Madison, town	26	20	14
Cazenovia, town	36	35	21	Madison, village	....	4	.....
Cazenovia, village	23	30	.....	Morrisville, village	8	8	.....
Chittenango, village	11	14	.....	Nelson, town	20	16	13
De Ruyter, town	15	14	9	Oneida, city	157	118	78
De Ruyter, village	1	10	.....	Smithfield, town	15	11	4
Earlville, village	15	10	.....	Stockbridge, town	26	20	13
Eaton, town	23	46	21	Sullivan, town	60	44	26
Fenner, town	13	8	10	Wampsville, village	2	4	.....
Georgetown, town	20	18	7	Delayed returns	1	.....	1
Hamilton, town	32	28	1				
Hamilton, village	34	23	.....	Total	726	621	283
Lebanon, town	20	15	6				

Monroe County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Brighton, town	62	43	20	Parma, town	49	25	.....
Brockport, village	66	49	.....	Penfield, town	59	27	16
Charlotte, village	15	31	.....	Perinton, town	41	32	37
Chili, town	26	16	13	Pittsford, town	25	20	20
Churchville, village	9	9	.....	Pittsford, village	30	16	.....
Clarkson, town	28	23	9	Riga, town	22	18	18
East Rochester, village	69	32	.....	Rochester, city	5,092	3,072	2,265
Fairport, village	48	49	.....	Rush, town	30	20	7
Gates, town	58	49	21	Spencerport, village	17	15	.....
Greece, town	23	94	45	Sweden, town	28	21	38
Hamlin, town	38	16	18	Webster, town	51	36	25
Henrietta, town	18	28	15	Webster, village	13	16	.....
Hilton, village	11	9	.....	Wheatland, town	52	33	16
Honeoye Falls, village	16	20	.....	Delayed returns	35	2	.....
Irondequoit, town	76	40	16				
Mendon, town	31	21	18	Total	6,171	3,915	2,647
Ogden, town	33	33	30				

Montgomery County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Akin, village	12	9	.....	Minden, town	31	29	38
Amsterdam, town	18	35	16	Mohawk, town	20	22	23
Amsterdam, city	695	541	394	Nelliston, village	11	13	.....
Canajoharie, town	27	18	37	Palatine, town	32	33	19
Canajoharie, village	32	41	.....	Palatine Bridge, village	13	6	.....
Charlestown, town	11	10	9	Root, town	16	28	5
Florida, town	23	17	10	St. Johnsville, town	1	6	28
Fonda, village	15	24	.....	St. Johnsville, village	61	45	.....
Fort Plain, village	47	60	.....	Delayed returns	10	1	3
Fultonville, village	14	18	.....				
Glen, town	10	23	14	Total	1,117	988	596
Hagaman, village	18	9	.....				

Nassau County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
East Rockaway, village	9	16	.....	North Hempstead, town	414	173	132
Farmingdale, village	31	20	.....	Oyster Bay, town	337	258	175
Floral Park, village	24	12	.....	Rockville Center, village	65	41	.....
Freeport, village	88	46	.....	Sea Cliff, village	22	33	.....
Hempstead, town	637	338	320	Delayed returns	20	2	1
Hempstead, village	76	89	.....				
Lawrence, village	7	3	.....	Total	1,800	1,136	628
Mineola, village	70	105	.....				

New York (Greater)

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
City of New York: Borough of Manhattan	66,358	38,668	*34,647	Borough of Queens	7,119	3,971	2,077
Borough of the Bronx	10,905	6,968	......	Borough of Richmond	1,991	1,467	526
Borough of Brooklyn	42,708	25,676	12,451	Total	129,081	76,750	49,701

* Includes marriages of Borough of Bronx.

Niagara County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Barker, village	9	9	.....	North Tonawanda	337	160	110
Cambria, town	35	15	17	Pendleton, town	24	15	7
Hartland, town	38	28	10	Porter, town	42	22	25
La Salle, village	50	14	.....	Royalton, town	71	49	48
Lewiston, town	49	25	25	Somerset, town	44	25	19
Lewiston, village	11	16	.....	Wheatfield, town	43	16	11
Lockport, town	45	62	14	Wilson, town	37	17	15
Lockport, city	340	299	140	Wilson, village	2	9	......
Middleport, village	15	21	.....	Youngstown, village	16	7	......
Newfane, town	73	41	26	Delayed returns	38	3	21
Niagara, town	....	.....	12				
Niagara Falls, city	811	549	436	Total	2,130	1,402	936

Oneida County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Annsville, town	22	17	11	Paris, town	38	31	6
Augusta, town	11	15	18	Prospect, village	3	.....	......
Ava, town	9	8	2	Remsen, town	13	16	2
Boonville, town	25	18	18	Remsen, village	4	12	......
Boonville, village	29	38	.....	Rome, city	570	412	156
Bridgewater, town	11	12	5	Sangerfield, town	17	7	12
Bridgewater, village	3	4	.....	Steuben, town	18	13	6
Camden, town	22	17	24	Sylvan Beach, village	1	6	......
Camden, village	26	35	.....	Trenton, town	34	19	19
Clayville, village	11	9	.....	Trenton, village	5	2	......
Clinton, village	15	19	.....	Utica, city	1,890	1,299	813
Deerfield, town	22	15	4	Vernon, town	26	30	17
Florence, town	14	16	5	Vernon, village	4	6	......
Floyd, town	13	10	1	Verona, town	49	41	31
Forestport, town	10	11	6	Vienna, town	18	22	18
Forestport, village	6	8	.....	Waterville, village	18	10	......
Holland Patent, village	3	4	.....	Western, town	26	23	3
Kirkland, town	67	37	31	Westmoreland, town	22	33	10
Lee, town	26	19	11	Whitesboro, village	38	33	......
Marcy, town	15	13	6	Whitestown, town	116	69	97
Marshall, town	21	24	9	Yorkville, village	10	6	......
New Hartford, town	99	67	55	Delayed returns	6	.....	3
New Hartford, village	17	24	.....				
Oneida Castle, village	1	3	.....	Total	3,431	2,542	1,399
Oriskany Falls, village	7	9	.....				

Onondaga County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Baldwinsville, village	45	51	.....	Manlius, village	29	12	......
Camillus, town	35	25	9	Marcellus, town	25	20	23
Camillus, village	13	11	.....	Marcellus, village	7	9	......
Cicero, town	51	28	12	Onondaga, town	62	132	35
Clay, town	43	29	19	Otisco, town	19	17	3
De Witt, town	40	43	47	Pompey, town	39	33	10
East Syracuse, village	94	47	.....	Salina, town	26	25	22
Eastwood, village	7	5	.....	Skaneateles, town	46	25	31
Elbridge, town	13	26	24	Skaneateles, village	20	28	......
Elbridge, village	8	7	.....	Solvay, village	100	77	......
Fabius, town	35	20	15	Spafford, town	17	11	7
Fabius, village	2	5	.....	Syracuse, city	2,796	2,124	1,144
Fayetteville, village	18	23	.....	Tully, town	23	10	9
Geddes, town	8	10	53	Tully, village	6	14	......
Jordan, village	3	16	.....	Van Buren, town	23	33	16
La Fayette, town	25	14	9	Delayed returns	51	2	14
Liverpool, village	22	20	.....				
Lysander, town	28	44	30	Total	3,833	3,046	1,572
Manlius, town	54	50	40				

Ontario County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Bristol, town	22	15	7	Naples, village	4	8	......
Canadice, town	18	11	6	Phelps, town	50	37	15
Canandaigua, town	35	16	81	Phelps, village	17	17	......
Canandaigua, village	182	157	.....	Richmond, town	21	17	9
Clifton Springs, village	23	64	.....	Seneca, town	52	32	18
East Bloomfield, town	14	26	14	Shortsville, village	27	12	......
Farmington, town	30	24	10	South Bristol, town	16	10	5
Geneva, town	14	7	3	Victor, town	30	19	......
Geneva, city	241	175	122	Victor, village	15	19	......
Gorham, town	27	14	6	West Bloomfield, town	8	20	10
Hopewell, town	23	31	6	Delayed returns	9	2	......
Manchester, town	29	21	26				
Manchester, village	23	17	.....	Total	951	779	360
Naples, town	21	8	22				

Orange County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Blooming Grove, town	18	22	13	Montgomery, village	17	13	......
Chester, town	39	18	16	Mount Hope	24	37	11
Chester, village	15	15	.....	Newburgh, town	81	76	25
Cornwall, town	49	52	41	Newburgh, city	541	509	238
Cornwall, village	46	37	.....	New Windsor, town	76	52	15
Crawford, town	17	27	4	Port Jervis, city	167	180	83
Deerpark, town	16	34	19	Tuxedo, town	54	60	13
Goshen, town	30	49	33	Unionville, village	5	9	......
Goshen, village	38	75	.....	Walden, village	70	49	......
Greenville, town	10	10	7	Wallkill, town	36	41	11
Hamptonburgh, town	22	22	6	Warwick, town	90	79	50
Highland Falls, village	93	49	.....	Warwick, village	47	41	......
Highlands, town	36	13	56	Washington, village	10	8	......
Middletown, city	268	274	147	Wawayanda, town	32	25	12
Minisink, town	7	16	4	Woodbury, town	37	39	13
Monroe, town	18	22	12	Delayed returns	31	3	......
Monroe, village	29	27	.....				
Montgomery, town	36	34	60	Total	2,105	2,017	889

Orleans County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Albion, town	15	36	46	Medina, village	91	101	......
Albion, village	67	85	.....	Murray, town	74	26	29
Barre, town	30	26	11	Ridgeway, town	39	23	53
Carlton, town	42	37	15	Shelby, town	31	28	24
Clarendon, town	26	25	6	Yates, town	34	20	16
Gaines, town	29	27	12	Delayed returns	16	.....	......
Holley, village	38	36	.....				
Kendall, town	31	19	11	Total	578	497	223
Lyndonville, village	15	8	.....				

Oswego County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Albion, town	19	17	18	Oswego, city	488	385	184
Altmar, village	6	4	.....	Palermo, town	24	18	8
Amboy, town	4	11	7	Parish, town	10	13	14
Boylston, town	19	10	5	Parish, village	5	12	......
Central Square, village	6	12	.....	Phoenix, village	23	26	......
Cleveland, village	8	11	.....	Pulaski, village	14	25	......
Constantia, town	25	16	0	Redfield, town	8	9	0
Fulton, city	245	155	96	Richland, town	35	35	28
Granby, town	31	21	18	Sandy Creek, town	20	15	12
Hannibal, town	36	23	19	Sandy Creek, village	5	17	......
Hannibal, village	7	7	.....	Schroeppel, town	25	17	23
Hastings, town	32	29	17	Scriba, town	34	23	13
Lacona, village	7	7	.....	Volney, town	41	36	13
Mexico, town	31	46	16	West Monroe, town	16	12	7
Mexico, village	15	27	.....	Williamstown, town	11	10	5
New Haven, town	22	19	8	Delayed returns	2	.....	1
Orwell, town	19	7	7				
Oswego, town	45	47	14	Total	1,338	1,122	533

Otsego County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Burlington, town	7	15	2	Oneonta, city	190	182	100
Butternuts, town	22	17	8	Otego, town	20	17	4
Cherry Valley, town	15	14	5	Otego, village	11	15	......
Cherry Valley, village	9	14	.....	Otsego, town	27	27	30
Cooperstown, village	50	58	.....	Pittsfield, town	11	9	8
Decatur, town	11	6	3	Plainfield, town	9	13	10
Edmeston, town	25	23	16	Richfield, town	9	17	25
Exeter, town	14	18	9	Richfield Springs, village	20	27	......
Gilbertsville, village	6	15	.....				
Hartwick, town	30	24	16	Roseboom, town	6	20	7
Laurens, town	16	17	8	Schenevus, village	6	6	......
Laurens, village	3	2	.....	Springfield, town	16	28	1
Maryland, town	22	25	11	Unadilla, town	24	24	22
Middletown, town	28	50	8	Unadilla, village	12	24	......
Milford, town	22	16	10	Westford, town	17	9	3
Milford, village	13	15	.....	Worcester, town	51	49	19
Morris, town	17	10	14	Delayed returns	13	5	......
Morris, village	5	12	.....				
New Lisbon, town	19	12	9	Total	792	847	349
Oneonta, town	16	12	1				

Putnam County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Brewster, village	18	29	.....	Phillipstown, town	23	48	35
Carmel, town	29	47	16	Putnam Valley, town	13	16	6
Cold Springs, village	74	47	.....	South East, town	27	30	32
Kent, town	7	18	8	Delayed returns	21	2	1
Nelsonville, village	5	18	.....				
Patterson, town	18	16	7	Total	235	271	105

Rensselaer County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Berlin, town	37	23	6	Poestenkill, town	20	18	8
Brunswick, town	37	32	10	Rensselaer, city	168	160	97
Castleton, village	28	24	.....	Sand Lake, town	22	27	15
East Greenbush, town	17	27	4	Schaghticoke, town	18	42	9
Grafton, town	11	12	13	Schaghticoke, village	12	18	......
Hoosick, town	25	35	83	Schodack, town	43	52	28
Hoosick Falls, village	129	86	.....	Stephentown, town	25	24	16
Nassau, town	21	26	12	Troy, city	924	1,597*	658
Nassau, village	3	10	.....	Valley Falls, village	9	7	......
North Greenbush, town	10	15	6	Delayed returns	52	1	4
Petersburg, town	25	13	6				
Pittstown, town	31	34	14	Total	1,667	2,283	989

Rockland County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Clarkstown, town	109	93	32	South Nyack, village	27	34	......
Grand View-on-Hudson, village	4	10	.....	Spring Valley, village	65	26	......
				Stony Point, town	89	54	22
Haverstraw, town	9	3	5	Suffern, village	46	47	......
Haverstraw, village	104	67	.....	Upper Nyack, village	7	7	......
Hillburn, village	19	13	.....	West Haverstraw, village	34	26	......
Nyack, village	100	96	.....				
Orangetown, town	76	55	80	Delayed returns	32	3	1
Piermont, village	9	35	.....				
Ramapo, town	99	107	72	Total	829	676	212

St. Lawrence County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Brasher, town	37	29	17	De Peyster, town	18	14	3
Canton, town	69	54	38	Edwards, town	26	19	11
Canton, village	38	52	.....	Edwards, village	8	6	......
Clare, town	9	6	6	Fine, town	48	26	17
Clifton, town	53	23	4	Fowler, town	24	15	14
Colton, town	32	25	9	Gouverneur, town	34	16	54
De Kalb, town	38	23	11	Gouverneur, village	77	79	......

St. Lawrence County — Continued

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Hammond, town	23	15	13	Oswegatchie, town	15	41	49
Hammond, village	10	9	.....	Parishville, town	39	24	18
Hermon, town	26	13	16	Piercefield, town	23	17	8
Hermon, village	12	12	.....	Pierrepont, town	27	21	9
Hopkinton, town	23	23	10	Pitcairn, town	20	7	5
Lawrence, town	22	23	17	Potsdam, town	48	30	66
Lisbon, town	27	30	18	Potsdam, village	72	76	......
Louisville, town	28	22	9	Richville, village	5	3	......
Macomb, town	22	14	10	Rossie, town	16	14	9
Madrid, town	25	24	6	Russell, town	39	22	13
Massena, town	37	15	51	Stockholm, town	54	36	18
Massena, village	72	50	.....	Waddington, town	16	11	11
Morristown, town	21	28	12	Waddington, village	5	12	......
Morristown, village	10	12	.....	Delayed returns	6	3	3
Norfolk, town	80	36	22				
Norwood, village	45	31	.....	Total	1,722	1,325	685
Ogdensburg, city	343	264	108				

Saratoga County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Ballston, town	19	32	12	Providence, town	10	9	2
Ballston Spa, village	85	75	.....	Saratoga, town	26	22	25
Charlton, town	18	11	4	Saratoga Springs, town	12	17	78
Clifton Park, town	37	40	10	Saratoga Springs, village	218	253	......
Corinth, town	32	11	18	Schuylerville, village	42	26	......
Corinth, village	63	35	.....	South Glens Falls, village	32	27	......
Day, town	10	9	5	Stillwater, town	26	45	37
Edinburg, town	10	12	7	Stillwater, village	14	22	......
Galway, town	18	18	9	Victory, village	8	5	......
Galway, village	0	4	.....	Waterford, town	46	57	54
Greenfield, town	23	32	9	Waterford, village	37	52	......
Hadley, town	18	6	7	Wilton, town	16	18	4
Half Moon, town	9	31	35	Delayed returns	9	1	3
Malta, town	10	25	7				
Mechanicville, village	218	117	.....	Total	1,140	1,083	415
Milton, town	36	40	48				
Moreau, town	21	13	33				
Northumberland, town	17	18	8				

Schenectady County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Duanesburgh, town	33	26	18	Schenectady, city	1,865	1,070	626
Glenville, town	15	24	15	Scotia, village	58	25	......
Niskayuna, town	39	30	12	Delayed returns	71	.....	1
Princetown, town	7	6	1				
Rotterdam, town	86	69	33	Total	2,174	1,250	706

Schoharie County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Blenheim, town	16	13	5	Richmondville, town	11	11	10
Broome, town	12	17	3	Richmondville, village	6	16	.....
Carlisle, town	6	13	7	Schoharie, town	18	27	18
Cobleskill, town	25	23	26	Schoharie, village	11	21	.....
Cobleskill, village	22	33	.....	Seward, town	26	17	7
Conesville, town	8	8	7	Sharon, town	21	21	5
Esperance, town	6	13	7	Sharon Springs, village	3	9	.....
Esperance, village	0	4	.....	Summit, town	15	14	8
Fulton, town	30	29	9	Wright, town	17	19	8
Gilboa, town	22	25	8	Delayed returns	7	.....	.....
Jefferson, town	24	18	7				
Middleburgh, town	21	29	17	Total	336	394	152
Middleburgh, village	9	14	.....				

Schuyler County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Burdette, village	3	7	.....	Orange, town	24	13	10
Catherine, town	18	13	8	Reading, town	14	14	4
Cayuta, town	7	8	3	Tyrone, town	19	16	5
Dix, town	15	14	34	Watkins, village	46	52	.....
Hector, town	49	52	17	Delayed returns	3	2	1
Montour, town	3	3	2				
Montour Falls, village	10	14	.....	Total	219	215	84
Odessa, village	8	7	.....				

Seneca County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Covert, town	19	20	29	Seneca Falls, village	128	112	.....
Fayette, town	34	26	14	Tyre, town	32	5	4
Interlaken, village	4	8	.....	Varick, town	21	20	8
Junius, town	19	17	9	Waterloo, town	15	20	37
Lodi, town	30	22	19	Waterloo, village	62	52	.....
Ovid, town	9	20	13	Delayed returns	2	.....	1
Ovid, village	5	9	.....				
Romulus, town	24	29	9	Total	414	372	181
Seneca Falls, town	10	12	38				

Steuben County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Addison, town	15	6	29	Campbell, town	13	21	4
Addison, village	22	52	.....	Canisteo, town	16	14	37
Avoca, town	19	24	14	Canisteo, village	27	30	.....
Avoca, village	13	15	.....	Caton, town	23	13	11
Bath, town	39	48	57	Cohocton, town	38	20	16
Bath, village	58	67	.....	Cohocton, village	10	12	.....
Bradford, town	8	15	0	Corning, town	34	41	14
Cameron, town	14	15	13	Corning, city	269	200	120

Steuben County — Continued

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Dansville, town	29	10	9	Rathbone, town	13	12	5
Erwin, town	19	13	19	Savona, village	9	17	......
Fremont, town	13	12	6	Thurston, town	5	15	6
Greenwood, town	28	15	11	Troupsburg, town	28	25	14
Hammondsport, village	26	17	.....	Tuscarora, town	11	9	5
Hartsville, town	7	9	5	Urbana, town	14	18	20
Hornby, town	10	8	3	Wayland, town	22	22	18
Hornell, city	230	173	113	Wayland, village	37	20	......
Hornellsville, town	28	31	4	Wayne, town	9	12	1
Howard, town	22	27	14	West Union, town	27	16	6
Jasper, town	31	18	9	Wheeler, town	12	13	8
Lindley, town	31	25	7	Woodhull, town	23	12	10
Painted Post, village	20	17	.....	Woodhull, village	2	6	......
Prattsburg, town	14	9	11	Delayed returns	4	5	1
Prattsburg, village	10	10	.....				
Pulteney, town	19	10	8	Total	1,371	1,199	628

Suffolk County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Amityville, village	39	66	.....	Riverhead, town	52	74	54
Babylon, town	95	72	71	Sag Harbor, village	49	53	......
Babylon, village	48	39	.....	Shelter Island, town	25	9	6
Bellport, village	3	.....	5	Smithtown, town	77	56	27
Brookhaven, town	184	194	97	Southampton, town	123	106	70
East Hampton, town	86	56	38	Southampton, village	39	33	......
Greenport, village	106	51	.....	Southold, town	124	74	91
Huntington, town	205	147	71	Delayed returns	50	9	3
Islip, town	318	190	79				
Northport, village	31	20	.....	Total	1,726	1,304	607
Patchogue, village	72	50	.....				

Sullivan County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Bethel, town	35	32	10	Mamakating, town	26	35	13
Callicoon, town	37	30	12	Monticello, village	58	58	......
Cochecton, town	17	15	5	Neversink, town	19	32	9
Delaware, town	35	22	14	Rockland, town	60	49	39
Fallsburgh, town	101	65	29	Thompson, town	26	41	34
Forestburgh, town	9	4	1	Tusten, town	14	17	7
Fremont, town	34	27	.....	Wurtsboro, village	4	7	......
Highland, town	16	26	12	Delayed returns	7	1	......
Liberty, town	68	97	35				
Liberty, village	40	101	.....	Total	622	670	224
Lumberland, town	16	11	4				

Tioga County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Barton, town..........	22	26	80	Owego, village.......	62	54	.....
Berkshire, town.......	8	12	5	Richford, town.......	14	11	5
Candor, town..........	38	23	21	Spencer, town........	18	15	16
Candor, village.........	8	14	.....	Spencer, village.......	10	9	.....
Newark Valley, town...	19	17	12	Tioga, town..........	27	31	12
Newark Valley, village..	23	11	.....	Waverly, village......	77	83	.....
Nichols, town..........	4	12	12	Delayed returns......	1	.....	.....
Nichols, village........	2	8	.....				
Owego, town..........	55	68	86	Total............	388	399	249

Tompkins County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Caroline, town........	37	27	13	Ithaca, city..........	234	238	146
Danby, town..........	24	19	7	Lansing, town........	50	32	20
Dryden, town.........	35	33	23	Newfield, town.......	15	19	4
Dryden, village........	10	14	.....	Newfield, village......	6	8	.....
Enfield, town..........	24	13	8	Trumansburg, village..	13	23	.....
Freeville, village.......	1	7	.....	Ulysses, town........	22	30	22
Groton, town.........	43	38	28	Delayed returns......	1	2	.....
Groton, village........	22	23	.....				
Ithaca, town..........	18	17	3	Total............	555	543	274

Ulster County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Denning, town........	11	6	4	Plattekill, town.......	23	22	13
Ellenville, village......	38	47	.....	Rifton, village........	10	3	.....
Esopus, town.........	82	54	21	Rochester, town......	41	34	2
Gardiner, town........	41	47	12	Rosendale, town......	47	41	17
Hardenburgh, town....	7	4	3	Rosendale, village....	15	15	.....
Hurley, town.........	22	30	8	Saugerties, town......	123	92	56
Kingston, town........	9	6	4	Saugerties, village....	61	64	.....
Kingston, city.........	433	475	233	Shandaken, town.....	44	41	15
Lloyd, town...........	58	38	19	Shawangunk, town....	53	33	18
Marbletown, town.....	75	57	28	Ulster, town.........	37	39	18
Marlborough, town....	50	45	24	Wawarsing, town.....	92	80	53
Marlborough, village...	18	11	.....	Woodstock, town.....	30	40	7
New Paltz, town......	22	39	34	Delayed returns......	107	.....	1
New Paltz, village.....	17	23	.....				
Olive, town...........	56	56	27	Total............	1,623	1,449	617
Pine Hill, village......	1	7	.....				

Warren County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Bolton, town	26	18	8	Luzerne, town	15	13	......
Caldwell, town	13	14	14	Queensbury, town	41	35	11
Chester, town	25	28	.....	Stony Creek, town	17	13	9
Glens Falls, city	290	238	154	Thurman, town	16	3	11
Hague, town	13	10	16	Warrensburgh, town	35	36	27
Horicon, town	11	18	9	Delayed returns	2	.....	32
Johnsburg, town	27	28	16				
Lake George, village	9	10	.....	Total	540	464	307

Washington County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Argyle, town	25	39	10	Hartford, town	25	30	12
Argyle, village	1	7	.....	Hebron, town	13	16	7
Cambridge, town	9	20	12	Jackson, town	16	9	3
Cambridge, village	11	31	.....	Kingsbury, town	28	24	56
Dresden, town	11	7	.....	Putnam, town	9	9	2
Easton, town	26	25	17	Salem, town	17	28	21
Fort Ann, town	40	27	16	Salem, village	22	16	......
Fort Ann, village	7	9	.....	Hudson Falls, village	100	74	......
Fort Edward, town	31	31	40	White Creek, town	19	26	21
Fort Edward, village	78	69	.....	Whitehall, town	9	8	63
Granville, town	51	49	78	Whitehall, village	129	96	......
Granville, village	82	36	.....	Delayed returns	5	1	1
Greenwich, town	43	43	33				
Greenwich, village	34	44	.....	Total	858	788	395
Hampton, town	17	14	3				

Wayne County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Arcadia, town	47	31	75	Palmyra, village	37	39	......
Butler, town	28	30	10	Red Creek, village	8	9	......
Clyde, village	55	37	.....	Rose, town	35	35	10
Galen, town	29	24	34	Savannah, town	19	16	10
Huron, town	28	17	13	Savannah, village	5	6	......
Lyons, town	22	30	46	Sodus, town	73	64	35
Lyons, village	72	75	.....	Walworth, town	38	32	10
Macedon, town	38	25	14	Williamson, town	74	44	32
Macedon, village	11	10	.....	Wolcott, town	28	25	33
Marion, town	56	32	14	Wolcott, village	8	29	......
Newark, village	82	85	.....	Delayed returns	3	0	1
Ontario, town	53	36	18				
Palmyra, town	38	27	33	Total	887	758	388

Westchester County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Ardsley, village	15	8	.....	North Pelham, village	31	13	......
Bedford, town	95	54	47	North Salem, town	14	19	9
Briarcliff Manor, village	20	11	.....	North Tarrytown, village	151	80	......
Bronxville, village	23	42	.....	Ossining, town	....	6	81
Cortlandt, town	118	87	160	Ossining, village	186	166	......
Croton-on-Hudson, village	35	23	.....	Peekskill, village	330	280	......
Dobbs Ferry, village	79	71	.....	Pelham, town	2	1	15
Eastchester, town	33	12	32	Pelham, village	7	4	......
Elmsford, village	14	3	.....	Pelham Manor, village	15	8	......
Greenburgh, town	50	69	136	Pleasantville, village	43	28	......
Harrison, town	77	56	20	Port Chester, village	445	207	......
Hastings-on-Hudson, village	96	57	.....	Poundridge, town	11	15	9
Hillside, village	8	55	.....	Rye, town	4	4	246
Irvington, village	41	23	.....	Rye, village	54	45	......
Larchmont, village	16	8	.....	Scarsdale, town	22	10	......
Lewisboro, town	13	20	4	Somers, town	27	17	14
Mamaroneck, town	6	10	56	Tarrytown, village	89	85	......
Mamaroneck, village	141	71	.....	Tuckahoe, village	125	38	......
Mt. Kisco, village	59	42	.....	White Plains, town	....	5	118
Mount Pleasant, town	56	174	113	White Plains, village	362	279	......
Mount Vernon, city	700	434	245	Yonkers, city	2,064	1,226	797
New Castle, town	43	33	18	Yorktown, town	34	51	14
New Rochelle, city	782	342	230	Delayed returns	108	1	1
North Castle, town	23	26	5	Total	6,667	4,317	2,370

Wyoming County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Arcade, town	13	15	22	Orangeville, town	13	28	5
Arcade, village	40	23	.....	Perry, town	18	22	52
Attica, town	18	10	.....	Perry, village	61	58	......
Attica, village	32	22	.....	Pike, town	12	11	11
Bennington, town	20	22	14	Pike, village	3	7	......
Castile, town	11	15	15	Sheldon, town	33	27	9
Castile, village	15	27	.....	Silver Springs, village	19	10	......
Covington, town	19	12	3	Warsaw, town	20	12	39
Eagle, town	21	12	12	Warsaw, village	34	39	......
Gainesville, town	23	15	15	Wethersfield, town	26	13	3
Gainesville, village	5	7	.....	Delayed returns	1	2	1
Genesee Falls, town	18	9	4				
Java, town	21	23	13	Total	515	469	224
Middlebury, town	19	28	6				

Yates County

	Births, 1910	Deaths, 1910	Marriages, 1910		Births, 1910	Deaths, 1910	Marriages, 1910
Barrington, town	19	18	3	Penn Yan, village	67	70	......
Benton, town	22	25	6	Potter, town	16	14	10
Dresden, village	6	2	.....	Rushville, village	5	10	......
Dundee, village	7	26	.....	Starkey, town	14	15	24
Italy, town	14	11	4	Torrey, town	10	8	0
Jerusalem, town	43	40	21	Delayed returns	....	.....	1
Middlesex, town	21	19	8				
Milo, town	24	21	37	Total	268	279	114

Summary of Mortality for the Year 1910

Pulmonary tuberculosis caused 14,059 or 9.5 per cent. of the 147,629 deaths occurring in the State during the year 1910. There were 153 deaths per 100,000 population.

From tuberculosis other than pulmonary there were 2,278 deaths, the largest number, one-half being from tubercular meningitis, and the next numerically abdominal tuberculosis, 385.

Pneumonia caused 9,867 deaths, 444 more than in 1909, 1,200 more than in 1908, but fewer than in the years preceding; 109 deaths per 100,000 population in the cities, and 103 in the rural population. From broncho-pneumonia there were 7,248 deaths, and from acute bronchitis 1,598. These were chiefly fatal in March, and during the annually recurring epidemic of influenza, which is given as the direct cause of 1,452 deaths.

Cancer showing in each succeeding year an increase, has this year caused 7,522 deaths; in 1900 there were 4,871; in 1890, 2,868. In the cities there were 80 deaths per 100,000 population; the rural rate was 99. Compared with tuberculosis its urban mortality was less than half, its rural considerably more than half the number from that cause.

Typhoid fever has caused during the year 1,374 deaths. This is about the mortality for the last two years, while the average yearly for twenty years prior was 1,600 deaths and most of the years were close to the average. The rate of mortality, 15 per 100,000 population, is the same as that of 1909, and the lowest ever recorded for the State. The urban mortality from typhoid fever was 14.9 per 100,000 population; the rural was 15.2; in the cities .93 per cent of the deaths were from typhoid fever, in the country .94 per cent.

Diphtheria caused 2,433 deaths, 120 more than in 1909, 40 less than in 1908, 350 less than the yearly average of the past twelve years of low mortality, and 3,000 less than the average of the twelve years prior to that. In the urban population there were 32 deaths per 100,000 during the year; in the rural 10 from diphtheria. Sixty-four per cent of the deaths occurred in the winter and spring months.

Scarlet fever was more prevalent than last year, and the deaths were 1,617 to 1,205 in 1909. There were 21 deaths per 100,000 population in the cities, and 8 in the rural population. New York City shared in the increase of mortality over last year to a less extent than the rest of the State.

Measles which last year had a mortality in excess of that from scarlet fever, has now 1,285 deaths or 332 less. In 11 years of the last 25 the deaths from measles have exceeded those from scarlet fever and their average mortality has been annually 1,100 to 1,350. Taking account of its remote effects, measles is probably fully as large a contributer to mortality as scarlet fever. The urban mortality has decreased but the rural is nearly double that of 1909. Six-sevenths of the cases and four-fifths of the deaths occurred during the first six months of the year.

Whooping cough, which has had an average yearly mortality for twenty-five years of 900, has now 727 deaths. In August the largest number, as heretofore noted, occurred, with July nearly as many, the smallest mortality having been in the winter months. The relative urban and rural mortality was the same.

Cerebrospinal meningitis caused 452 deaths, an increase over the two years preceding but one-half that of the three prior years. Cases were reported from thirty-five counties, two-thirds of the deaths occurring in New York City.

There were 58 deaths from epidemic poliomyelitis.

Smallpox caused 7 deaths — one at Buffalo, one at Walden, and five in New York City.

Violence was the cause of 9,846 deaths — 614 more than in 1909. There were 1,479 by suicide, 420 homicides and 7,695 accidental.

The following shows the urban and rural death rates per 100,000 population:

Urban and rural death rates per 100,000 population from different causes:

Diseases	Cities	Rural
All causes	1,606.9	1,627.1
Typhoid fever	14.9	15.2
Malaria	0.5	1.1
Measles	15.2	0.82
Scarlet fever	20.7	8.3
Whooping cough	7.8	8.2
Diphtheria and croup	32.1	10.0
Influenza	9.4	34.9
Erysipelas	6.1	4.7
Cerebrospinal meningitis	5.5	3.3
Pulmonary tuberculosis	164.0	122.3
Other forms of tuberculosis	27.1	18.4
Cancer and other malignant tumors	79.5	89.8
Diabetes	16.0	17.5
Other general diseases	55.2	55.0
Diseases of nervous system	91.0	223.9
Diseases of circulatory system	212.3	214.5
Pneumonia	109.2	103.3
Other disease of respiratory system	138.7	93.5
Diarrhea and enteritis	127.0	85.8
Under 2 years	111.9	59.3
Over 2 years	15.2	26.5
Other diseases of digestive system	82.6	88.0
Bright's disease and nephritis	103.0	115.2
Other diseases of genito-urinary system	32.9	36.6
The puerperal state	16.9	12.6
Congenital debility (under 3 mos.)	59.0	24.2
Accidents	81.3	91.9
Suicides	15.6	17.6
Homicides	5.1	2.8
Ill-defined diseases	29.0	51.8
All other causes	47.9	67.3

The total urban population (cities and villages of 8,000 population and over) is 6,849,203, or 74.7 per cent. of the entire population of the State.

The following table shows the mortality in the State by age periods, sex, color, nationality, etc., outside of the cities of Buffalo and Greater New York.

AGE	Total		White		Negro		Other Colored		Native	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Under 1....	5,545	4,228	5,426	4,153	116	74	3	1	5,521	4,213
1- 4......	1,785	1,689	1,739	1,647	43	40	3	2	1,730	1,635
5- 9......	539	552	527	538	8	12	4	2	524	523
10-14......	400	379	386	364	13	13	1	2	361	355
15-19......	660	601	644	578	16	23	.....	.....	548	531
20-29......	2,218	1,761	2,167	1,709	48	47	3	5	1,580	1,411
30-39......	2,543	1,871	2,464	1,827	75	44	4	.....	1,827	1,489
40-49......	2,939	2,226	2,868	2,183	67	41	4	2	1,983	1,622
50-59......	3,712	2,872	3,647	2,818	59	53	6	1	2,640	2,120
60-69......	4,903	4,389	4,852	4,352	45	37	6	.....	3,309	2,895
70-79......	5,340	5,246	5,290	5,210	45	35	5	1	3,625	3,509
80 and over.	3,455	3,987	3,435	3,958	18	29	2	.....	2,326	2,787
Unknown..	115	47	108	43	6	4	1	.....	27	34
Total....	34,154	29,848	33,553	29,380	559	452	42	16	26,010	23,124

AGE	Foreign Born		Nativity Unknown		Single		Married		Widowed and Divorced	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Under 1....	23	15	1	.....	5,545	4,228	.....	.....	.....	......
1- 4......	43	49	3	5	1,785	1,689	.....	.....	.....	......
5- 9......	14	27	1	2	539	552	.....	.....	.....	......
10-14......	35	24	4	.....	400	378	.....	1	.....	......
15-19......	103	67	9	3	652	520	5	81	.....	......
20-29......	586	343	52	7	1,610	692	521	1,032	35	27
30-39......	627	368	89	14	985	420	1,377	1,323	96	118
40-49......	857	582	99	22	728	388	1,892	1,539	204	279
50-59......	984	730	88	22	593	349	2,534	1,793	477	699
60-69......	1,520	1,446	74	48	538	440	3,223	1,922	1,043	1,978
70-79......	1,662	1,676	53	61	360	448	2,944	1,348	1,933	3,385
80 and over.	1,094	1,159	35	41	156	283	1,321	390	1,911	3,272
Unknown..	24	13	64	.....	28	8	18	18	11	16
Total....	7,572	6,499	572	225	13,919	10,395	13,835	9,447	5,710	9,774

Marital condition unknown, 922; Males, 690; Females, 232

The mortality statistics of Buffalo and Greater New York as classified by the city departments of health, are as follows:

THE CITY OF NEW YORK

Total Number of Deaths, by the Principal Causes, in 1910

BOROUGH	Typhoid fever	Malarial fever	Small-pox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza
Manhattan	269	7	4	271	448	154	898	162
The Bronx	41	4	......	56	75	23	136	26
Brooklyn	198	13	1	422	385	92	558	144
Queens	39	3	......	30	33	21	104	24
Richmond	11	......	......	6	12	4	19	10
City	558	27	5	785	953	294	1,715	366

THE CITY OF NEW YORK — (*Continued*)

BOROUGH	Other epidemic diseases	Tuberculosis of the lungs	Tuberculous meningitis	Other forms of tuberculosis	Cancer and other malignant tumors	Simple meningitis	Of which cerebrospinal meningitis	Congestion, hemorrhage and softening of the brain
Manhattan	292	3,975	485	329	1,915	380	177	389
The Bronx	24	1,781	84	31	323	53	29	254
Brooklyn	132	2,430	198	186	1,212	136	72	245
Queens	13	358	24	24	185	31	12	55
Richmond	6	148	10	11	75	8	4	36
City	467	8,692	801	581	3,710	608	294	979

THE CITY OF NEW YORK — (*Continued*)

	Organic diseases of the heart	Acute bronchitis	Chronic bronchitis	Pneumonia (not including broncho-pneumonia)	Broncho-pneumonia	Other respiratory diseases	Diseases of the stomach	Diarrhea and enteritis (under five years of age)
Manhattan	3,071	406	103	2,666	2,725	501	251	3,021
The Bronx	706	51	10	462	312	57	38	342
Brooklyn	2,540	405	278	2,001	1,644	220	166	2,092
Queens	405	59	9	305	221	27	25	359
Richmond	148	7	7	106	77	15	21	104
City	6,870	928	407	5,540	4,979	820	501	5,918

THE CITY OF NEW YORK — (*Continued*)

BOROUGH	Appendicitis and typhilitis	Hernia and intestinal obstruction	Cirrhosis of the liver	Nephritis and Bright's disease	Non-cancerous tumors and other diseases of the female genital organs	Puerperal septicemia	Other puerperal diseases	Congenital debility and malformations
Manhattan	340	308	545	2,627	200	138	249	2,396
The Bronx	43	45	75	411	21	31	28	262
Brooklyn	223	198	445	2,160	120	74	194	1,311
Queens	20	27	47	317	6	11	20	254
Richmond	13	9	28	123	2	1	15	90
City	639	587	1,140	5,638	349	255	506	4,313

THE CITY OF NEW YORK — (*Continued*)

BOROUGH	Senile debility	Violent deaths	Accidents	Homicides	Suicides	Other diseases	Ill-defined causes
Manhattan	235	2,101	1,919	182	459	5,818	522
The Bronx	68	280	270	10	64	664	87
Brooklyn	274	1,101	1,023	78	246	3,610	22
Queens	73	245	231	14	40	505	52
Richmond	33	86	84	2	16	174	36
City	683	3,813	3,527	286	825	10,771	719

THE CITY OF NEW YORK — (*Continued*)

Deaths According to Age and Color

BOROUGH	Under 1 year	1	2	3	4	Total under 5	5	10	15	20
Manhattan	8,953	2,283	935	553	323	13,047	831	467	775	1,303
The Bronx	1,051	271	149	90	65	1,626	159	91	209	342
Brooklyn	5,059	1,535	710	387	256	7,947	707	373	544	845
Queens	869	201	92	59	41	1,262	110	56	78	152
Richmond	282	61	19	11	12	385	27	23	30	50
City	16,214	4,351	1,905	1,100	697	24,267	1,834	1,010	1,636	2,692

THE CITY OF NEW YORK — (*Continued*)

BOROUGH	25	30	35	40	45	50	55	60	65
Manhattan	1,630	1,916	2,110	2,267	2,305	2,316	2,036	2,080	1,863
The Bronx	398	445	463	589	459	421	239	378	345
Brooklyn	1,032	1,135	1,372	1,349	1,355	1,481	1,377	1,526	1,432
Queens	137	169	207	191	204	248	194	237	230
Richmond	55	47	93	62	67	85	90	87	105
City	3,252	3,712	4,245	4,458	4,390	4,551	3,936	4,308	3,975

THE CITY OF NEW YORK — (*Continued*)

BOROUGH	70	75	80	85	Total	Colored	Chinese	Death rate	Corrected inter-borough death-rate*
Manhattan	1,500	1,046	650	468	38,660	1,401	83	16.51	16.72
The Bronx	337	231	134	102	6,968	203	3	15.85	13.95
Brooklyn	1,259	919	598	425	25,676	582	12	15.59	15.75
Queens	185	173	72	66	3,971	84	1	13.77	14.30
Richmond	114	54	59	34	1,467	33	......	16.94	16.18
City	3,395	2,423	1,513	1,095	76,742	2,303	99	15.98	......

* Corrected interborough death rate means that the death rate of each borough is corrected by the exclusion of the deaths of residents of the other boroughs occurring within its limits and the inclusion of the deaths of residents of that borough occurring in other boroughs.

THE CITY OF NEW YORK — (*Concluded*)

Births, Marriages and Still Births Reported

BOROUGH	Estimated population	Births	Marriages	Still births
Manhattan	2,341,383	66,357	28,883	3,541
The Bronx	439,567	10,905	2,308	553
Brooklyn	1,647,294	42,708	12,881	2,221
Queens	288,440	7,119	1,839	347
Richmond	86,580	1,991	506	93
City	4,803,264	129,080	46,417	6,755

CITY OF BUFFALO

Summaries of Deaths for 1910

TOTALS 1910	Total	AGE BY YEARS					
		Under 1	1 to 2	2 to 3	3 to 4	4 to 5	Total under 5 yrs.
I. General diseases	1,981	191	135	88	79	49	542
II. Diseases of nervous system	626	36	11	7	4	4	62
III. Diseases of circulatory system	912	14	.....	.....	2	.....	16
IV. Diseases of respiratory system	955	335	95	30	22	11	493
V. Diseases of digestive system	915	487	87	8	6	3	591
VI. Diseases of genito-urinary system	417	27	4	1	2	2	36
VII. Childbirth	132	80	.....	.....	.....	.....	80
VIII. Diseases of the skin	12	3	.....	.....	.....	.....	3
IX. Diseases of locomotor system	2	.....	.....	.....	.....	.....	......
X. Malformations	59	57	1	.....	.....	.....	58
XI. Early infancy	339	334	3	1	.....	.....	338
XII. Old age	53	.....	.....	.....	.....	.....	......
XIII. Violence	468	14	8	6	2	6	36
XIV. Ill-defined diseases	69	63	4	1	.....	.....	68
Total	6,940	1,641	348	142	117	75	2,323

CITY OF BUFFALO — (*Continued*)

TOTALS, 1910	AGE BY YEARS						
	5 to 10	10 to 15	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60
I. General diseases	120	39	79	247	244	217	219
II. Diseases of nervous system	7	9	8	20	35	76	102
III. Diseases of circulatory system	5	13	17	31	59	91	173
IV. Diseases of respiratory system	9	6	9	34	49	62	61
V. Diseases of digestive system	16	13	12	26	43	61	60
VI. Diseases of genito-urinary system	5	5	4	21	37	57	67
VII. Childbirth	.....	.....	1	22	23	6	......
VIII. Diseases of the skin	1	.....	.....	2	3	.....	1
IX. Diseases of locomotor system	.....	1	.....	.....	.....	1	......
X. Malformations	1	.....	.....	.....	.....	.....	......
XI. Early infancy	1	.....	.....	.....	.....	.....	......
XII. Old age	.....	.....	.....	.....	.....	.....	......
XIII. Violence	27	11	27	83	83	80	55
XIV. Ill-defined diseases	.....	.....	.....	.....	.....	1	......
Total	192	97	157	486	576	652	738

CITY OF BUFFALO — (*Continued*)

TOTALS, 1910	Age by Years				Color	
	60 to 70	70 to 80	80 to 90	Over 90	White	Colored
I. General diseases	163	88	20	3	1,959	22
II. Diseases of nervous system	126	115	62	4	623	3
III. Diseases of circulatory system	196	191	108	12	902	9
IV. Diseases of respiratory system	72	96	55	9	945	10
V. Diseases of digestive system	47	29	14	3	911	4
VI. Diseases of genito-urinary system	86	66	30	3	413	4
VII. Childbirth	......	......	......	......	132	....
VIII. Diseases of the skin	......	2	......	......	12	....
IX. Diseases of locomotor system	......	......	......	......	2	....
X. Malformation	......	......	......	......	59	....
XI. Early infancy	......	......	......	......	338	1
XII. Old age	1	16	27	9	53	....
XIII. Violence	36	23	4	3	463	5
XIV. Ill-defined diseases	......	......	......	......	69	....
Total	727	626	320	46	6,882	58

CITY OF BUFFALO — (*Concluded*)

TOTAL, 1910	Sex		Social Relations			
	Male	Female	Single	Married	Widowed	Divorced
I. General diseases	1,007	974	1,111	666	194	10
II. Diseases of nervous system	327	299	167	252	202	5
III. Diseases of circulatory system	490	422	161	415	333	3
IV. Diseases of respiratory system	512	443	587	210	157	1
V. Diseases of digestive system	479	436	679	163	71	2
VI. Diseases of genito-urinary system	221	196	121	184	110	2
VII. Childbirth	48	84	82	50	....	....
VIII. Diseases of the skin	6	6	6	5	1	....
IX. Diseases of locomotor system	2	......	1	1	....	....
X. Malformation	31	28	59	......	....	....
XI. Early infancy	195	144	339	......	....	....
XII. Old age	20	33	4	6	43	....
XIII. Violence	389	79	221	198	48	1
XIV. Ill-defined diseases	40	29	68	......	1	....
Total	3,767	3,173	3,606	2,150	1,160	24

The following shows the total number of deaths occurring in the State during the year, and the sex, color, social relations and nationality:

Sex		Color		Social relations		Nativities	
Males	79,643	White	144,102	Married	49,668	United States	101,341
Females	67,986	Negro	3,370	Widowed	29,204	Foreign	45,117
Unknown		Mongolian	99	Single	67,261	Unknown	1,171
		Indian	58	Divorced*	103		
				Unknown	1,393		
Total	147,629	Total	147,629	Total	147,629	Total	147,629

* Of New York City only — Buffalo's and rest of State being included under title "widowed."

The death rate and per cent. of deaths at different age periods were as follows:

AGE PERIOD	Number of deaths	Death rate per 1,000 living at all ages	Per cent. of total mortality
Under one year	27,457	2.9	18.7
One year to four years	12,233	1.3	8.3
Five to nine years	3,127	0.3	2.1
Ten to nineteen years	4,942	0.5	3.4
Twenty to thirty-nine years	23,340	2.5	15.8
Forty to fifty-nine years	30,557	3.3	20.7
Sixty to seventy-nine years	34,745	3.8	23.5
Over eighty years	11,054	1.2	7.5
Unknown	174	0.2	0.2
Total deaths at all ages	147,629	16.1	100.0

The following shows the death rate and per cent. of deaths from different causes:

Death Rate and Per Cent. of Deaths from Different Causes

	Number of deaths	Death rate per 1,000 living	Per cent. of total mortality
1. General diseases	39,900	4.35	27.1
2. Diseases of nervous system	11,856	1.29	8.0
3. Diseases of circulatory system	19,497	2.12	13.2
4. Diseases of respiratory system	21,529	2.35	14.5
5. Diseases of digestive system	18,374	2.00	12.4
6. Diseases of genito-urinary system	12,811	1.39	8.6
7. The puerperal state	1,452	0.15	0.98
8. Diseases of skin and cellular tissue	654	0.71	0.44
9. Diseases of organs of locomotion	272	0.03	0.18
10. Malformations	1,319	0.14	0.09
11. Early infancy	6,937	0.75	4.7
12. Old age	1,951	0.21	1.3
13. External causes	9,846	1.07	6.6
14. Ill-defined causes	1,231	0.13	0.83
Total deaths from all causes	147,629	16.1	100.0

DEATH RATE & PER CENT OF DEATHS AT DIFFERENT AGE PERIODS 1910

AGE PERIOD	Nº OF DEATHS	DEATH RATE PER 1000 LIVING AT ALL AGES	PER CENT OF TOTAL MORTALITY
UNDER 1 YEAR	27.457	2.9	18.7
1 YEAR TO 4 YEARS	12.233	1.3	8.3
5 " " 9 "	3.127	0.3	2.1
10 " " 19 "	4.942	0.5	3.4
20 " " 39 "	23.340	2.5	15.8
40 " " 59 "	30.557	3.3	20.7
60 " " 79 "	34.745	3.8	23.5
OVER 80 "	11.054	1.2	7.5
UNKNOWN	.174	0.2	0.2
TOTAL DEATHS AT ALL AGES	147.629	16.1	100.-

DEATH RATE & PER CENT OF DEATHS FROM DIFFERENT CAUSES
NEW YORK STATE 1910

		Nº OF DEATHS
I	GENERAL DISEASES	39.900
II	DISEASES OF NERVOUS SYSTEM	11.856
III	" CIRCULATORY "	19.497
IV	" RESPIRATORY "	21.529
V	" DIGESTIVE "	18.374
VI	" GENITO-URINARY "	12.811
VII	THE PUERPERAL STATE	1.452
VIII	DISEASES OF SKIN & CELLULAR TISSUE	.654
IX	" ORGANS OF LOCOMOTION	.272
X	MALFORMATIONS	1.319
XI	EARLY INFANCY	6.937
XII	OLD AGE	1.951
XIII	EXTERNAL CAUSES	9.846
XIV	ILL DEFINED CAUSES	1.231
	TOTAL DEATHS FROM ALL CAUSES	147.629

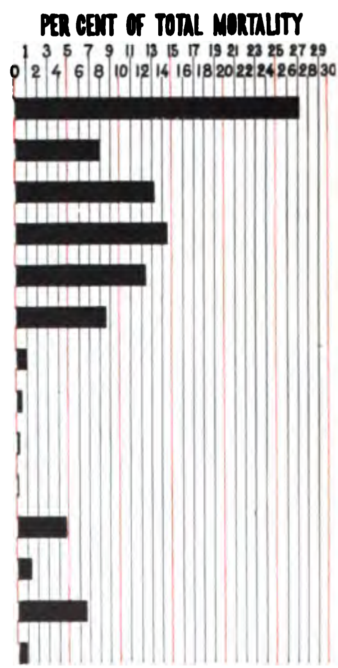
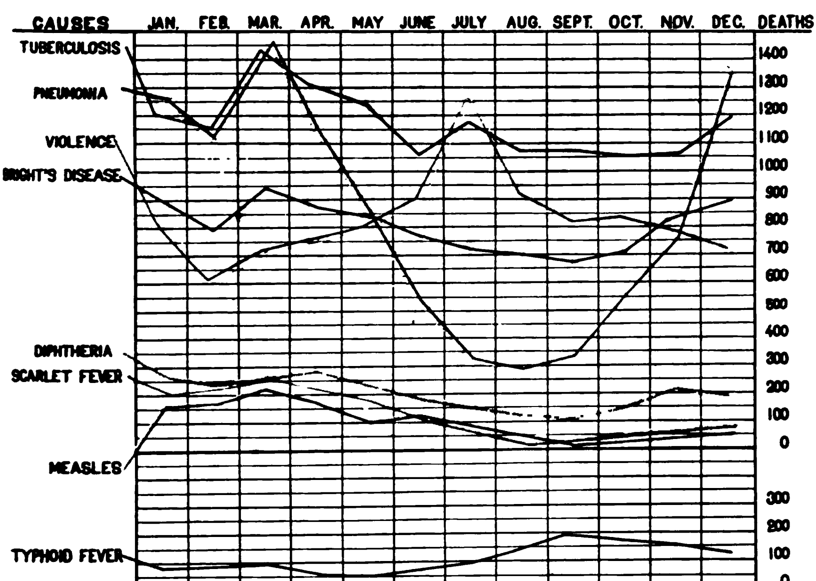


CHART SHOWING TOTAL
DEATHS BY MONTHS
DURING 1910 IN NEW YORK STATE
FROM THE
CHIEF CAUSES OF DEATH



The following table shows the seasonal fatality from the chief causes of death:

Seasonal Fatality, Etc.

	January	February	March	April	May	June
Tuberculosis of the lungs	1,204	1,156	1,427	1,311	1,242	1,068
Pneumonia	1,249	1,058	1,429	1,149	857	524
Violence	809	619	710	750	795	887
Bright's disease	891	796	947	874	834	766
Cancer	627	584	652	622	623	595
Diphtheria	276	248	271	275	238	198
Scarlet fever	226	221	253	223	177	138
Typhoid fever	92	90	96	72	63	71
Measles	170	173	219	195	134	138
Total mortality in the State from all causes	13,158	12,109	14,397	13,085	12,099	11,066

Seasonal Fatality, Etc. — (Concluded)

	July	August	September	October	November	December	Total
Tuberculosis of the lungs	1,180	1,085	1,078	1,055	1,060	1,193	14,059
Pneumonia	321	286	333	553	761	1,347	9,867
Violence	1,253	917	812	824	765	705	9,846
Bright's disease	740	718	696	718	830	901	9,711
Cancer	601	642	670	639	637	630	7,522
Diphtheria	159	131	108	131	209	189	2,433
Scarlet fever	73	36	41	53	83	93	1,617
Typhoid fever	97	135	191	172	163	132	1,374
Measles	83	47	36	12	31	47	1,285
Total mortality in the State from all causes	13,098	12,238	11,441	11,108	10,938	12,892	147,629

The following table shows the deaths and death rate from the principal causes of death in the counties of the State:

COUNTY	Pulmonary Tuberculosis		Typhoid Fever		Diphtheria	
	Number deaths	Rate per 100,000 population	Number	Rate	Number	Rate
Albany	344	197.8	44	25.3	34	19.6
Allegany	17	41.1	7	16.9	1	2.4
Broome	93	117.6	11	13.9	13	16.4
Cattaraugus	40	60.7	7	10.7	9	13.7
Cayuga	67	99.7	19	28.2	8	11.9
Chautauqua	66	62.6	15	14.2	22	20.9
Chemung	54	98.6	14	25.6	9	16.4
Chenango	25	70.3	3	8.4	4	11.2
Clinton	61	126.3	7	14.5	6	12.4
Columbia	62	141.9	12	27.5	3	6.9
Cortland	13	44.4	12	41.0	3	10.2
Delaware	28	61.5	17	37.3	4	8.8
Dutchess	126	143.5	13	14.8	13	14.8
Erie	612	115.1	86	16.4	183	34.4
Essex	57	170.0	6	17.9	12	35.8
Franklin	177	388.0	10	21.9	11	24.1
Fulton	40	89.6	4	9.0	3	6.7
Genesee	26	69.0	8	21.2	3	8.0
Greene	64	202.0	11	36.4	1	3.3
Hamilton	6	137.9	3	69.0	0	0
Herkimer	56	99.2	2	3.5	5	8.9
Jefferson	67	83.3	39	48.5	5	6.2
Lewis	28	113.0	2	8.1	1	4.0
Livingston	28	73.5	5	13.1	1	2.6
Madison	26	66.2	5	12.7	1	2.5
Monroe	322	112.9	39	13.7	43	15.1
Montgomery	60	103.6	11	19.0	15	25.9
Nassau	70	82.7	6	7.1	14	16.5
New York city	8,690	180.8	558	11.6	1,715	35.7
Niagara	85	92.0	42	45.5	22	23.8
Oneida	192	124.1	16	10.3	30	19.4
Onondaga	187	92.9	54	26.8	36	17.9
Ontario	36	68.9	9	17.2	2	3.8
Orange	167	143.6	27	23.2	23	19.8
Orleans	35	109.3	3	9.4	2	6.3
Oswego	65	90.6	17	23.7	5	7.0
Otsego	32	67.8	4	8.5	2	4.2
Putnam	18	122.5	0	0	1	6.8
Rensselaer	229	187.2	26	21.3	18	14.7
Rockland	65	138.4	5	11.1	4	8.9
St. Lawrence	69	77.6	20	22.5	9	10.1
Saratoga	74	119.5	13	21.0	7	11.3
Schenectady	83	93.2	5	5.6	18	20.2
Schoharie	22	92.4	2	8.4	2	8.4
Schuyler	9	64.5	1	7.2	0	0
Seneca	29	107.6	1	3.7	1	3.7
Steuben	45	54.0	18	21.6	1	1.2
Suffolk	102	105.7	13	13.5	11	11.4
Sullivan	189	559.6	9	26.6	2	5.9
Tioga	16	62.6	2	7.8	0	0
Tompkins	29	86.2	7	20.8	0	0
Ulster	130	141.3	17	18.5	25	27.2
Warren	35	108.6	6	18.6	1	3.1
Washington	52	108.8	6	12.6	1	2.1
Wayne	33	65.7	8	15.9	1	2.0
Westchester	403	141.2	39	13.7	65	22.8
Wyoming	15	47.0	10	31.3	2	6.3
Yates	16	8.6	5	26.9	0	0
State institutions	272	....	13	....	0	0
Total	14,059	153.5	1,374	15.0	2,433	26.5

COUNTY	Diarrhea (Under 2 Years)		Influenza		Cancer	
	Number	Rate	Number	Rate	Number	Rate
Albany	142	81.7	46	26.6	191	109.8
Allegany	12	29.0	17	41.1	34	82.2
Broome	49	62.0	16	20.2	77	97.4
Cattaraugus	31	47.0	18	27.3	69	104.7
Cayuga	47	70.0	15	22.3	69	102.7
Chautauqua	68	64.4	36	34.1	91	86.2
Chemung	21	38.3	21	38.3	54	98.6
Chenango	16	45.0	24	67.6	34	95.7
Clinton	35	72.5	18	37.3	26	53.8
Columbia	32	73.2	17	38.9	41	93.8
Cortland	7	23.9	9	30.8	32	109.4
Delaware	15	32.9	21	46.1	48	105.4
Dutchess	60	68.3	13	14.8	80	91.0
Erie	435	81.8	42	7.9	380	71.4
Essex	25	74.6	18	53.7	24	71.6
Franklin	40	87.7	19	41.7	33	72.3
Fulton	26	58.2	14	31.4	42	94.1
Genesee	25	66.3	12	31.8	39	103.5
Greene	13	43.1	5	16.6	31	102.7
Hamilton	3	69.0	1	23.0	2	46.0
Herkimer	34	60.2	15	26.6	40	70.8
Jefferson	43	53.5	24	30.0	76	94.5
Lewis	11	44.4	14	56.5	26	104.9
Livingston	24	63.0	9	23.6	29	76.1
Madison	20	50.9	19	48.4	40	101.8
Monroe	276	96.8	29	10.2	266	93.3
Montgomery	100	172.7	8	13.8	38	45.6
Nassau	92	108.7	9	10.6	62	73.3
New York city	5,655	1,175.3	366	7.6	3,709	77.1
Niagara	86	153.1	14	15.2	58	62.8
Oneida	162	104.7	35	22.6	148	95.6
Onondaga	200	99.4	31	15.4	176	87.5
Ontario	22	42.1	16	30.6	65	124.3
Orange	84	72.2	31	26.7	99	85.1
Orleans	19	59.3	11	34.3	35	109.3
Oswego	42	58.5	17	23.7	63	87.8
Otsego	23	48.7	29	61.5	52	110.2
Putnam	11	74.9	6	40.8	18	122.5
Rensselaer	82	67.0	42	34.3	125	92.2
Rockland	38	84.3	7	15.5	34	75.5
St. Lawrence	63	70.9	38	42.7	66	74.2
Saratoga	49	79.1	26	42.0	66	106.6
Schenectady	130	146.1	6	6.7	52	58.4
Schoharie	3	12.6	10	42.0	25	105.0
Schuyler	4	28.7	9	64.5	13	93.1
Seneca	8	29.7	10	37.1	26	96.5
Steuben	27	32.4	22	26.4	73	87.5
Suffolk	64	66.3	29	30.1	69	71.5
Sullivan	28	82.9	17	50.3	13	38.5
Tioga	13	50.8	9	11.7	20	78.2
Tompkins	9	26.8	18	53.5	47	139.7
Ulster	39	42.4	36	39.1	70	76.1
Warren	7	21.7	9	27.9	35	108.6
Washington	31	64.8	25	52.3	36	75.3
Wayne	26	51.8	21	41.8	37	73.7
Westchester	383	134.2	29	10.2	243	85.1
Wyoming	18	56.4	8	25.1	24	75.2
Yates	7	37.6	9	48.3	13	69.8
State institutions	1	....	7	....	38	....
Total	9,036	98.6	1,452	15.8	7,522	82.1

Mortality from Principal

CITY	Population	Total Deaths		Typhoid		Pulmonary Tuberculosis		Cancer	
		All causes	Rate per 1,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
Lackawanna	14,549	397	27.3	1	7.0	18	123.7	3	20.6
Troy	76,836	1,597	20.8	15	19.5	175	227.8	83	107.9
Cohoes	24,737	509	20.6	19	76.8	49	198.0	14	56.6
Hudson	11,462	236	20.6	6	52.3	26	226.8	9	78.5
Rome	20,632	411	19.9	4	19.3	26	126.0	23	111.3
Albany	100,358	1,943	19.4	15	14.9	239	238.1	135	134.5
Cortland	11,517	219	19.0	9	78.1	3	26.0	14	121.5
Oneonta	9,552	181	18.9	2	20.9	6	62.8	13	136.5
Newburg	27,868	510	18.3	12	43.1	50	179.4	25	89.5
Kingston	25,929	475	18.3	5	19.2	46	177.4	21	80.9
Port Jervis	9,304	170	18.3	6	64.5	11	118.2	10	107.4
Niagara Falls	30,617	551	18.0	30	97.9	32	104.5	14	45.6
Middletown	15,297	275	18.0	4	26.1	27	176.5	16	104.5
Watertown	26,792	468	17.5	24	89.6	21	78.3	23	85.8
Plattsburg	11,182	195	17.4	3	26.8	23	207.7	9	80.5
Utica	74,879	1,297	17.3	5	6.7	94	125.5	65	87.1
Watervliet	15,099	261	17.3	7	46.4	21	139.1	8	53.0
Amsterdam	31,586	540	17.1	7	22.1	32	101.3	15	47.4
Ogdensburg	15,981	268	16.8	6	37.5	17	106.4	14	87.5
Poughkeepsie	28,055	466	16.6	5	17.8	35	124.8	27	96.1
Lockport	17,993	299	16.6	2	11.1	25	138.9	12	66.6
Ithaca	14,815	244	16.5	5	33.7	15	101.2	16	108.0
Oswego	23,410	385	16.4	12	51.2	17	72.6	20	86.0
Buffalo	425,715	6,877	16.2	78	18.3	510	119.8	305	71.7
Dunkirk	17,308	279	16.1	4	23.1	11	63.4	13	75.1
New York (Gr.)	4,799,639	76,750	16.0	558	11.6	8,690	181.1	3,709	77.3
Manhattan	2,341,312	38,668	16.1	269	11.6	3,976	171.0	1,915	82.4
Bronx	437,791	6,968	15.9	41	9.4	1,779	406.4	323	73.8
Brooklyn	1,646,285	25,676	15.6	198	12.0	2,429	147.4	1,212	73.6
Queens	287,725	3,971	13.8	39	13.5	358	124.2	185	64.2
Richmond	86,526	1,467	17.0	11	12.7	148	170.2	74	85.1
Binghamton	48,671	765	15.7	6	12.4	58	119.2	41	84.1
Glens Falls	15,268	241	15.7	2	13.1	18	117.9	12	79.2
Little Falls	12,326	194	15.7	1	8.1	10	81.1	5	40.5
Gloversville	20,730	321	15.5	2	9.6	16	77.2	15	72.3
Syracuse	138,087	2,124	15.4	38	27.5	123	89.1	125	90.5
Yonkers	80,589	1,226	15.2	15	18.6	120	148.9	59	73.2
Auburn	34,760	522	15.0	3	8.6	41	118.0	39	112.3
Elmira	37,238	554	14.9	10	26.9	19	51.0	38	101.8
Rensselaer	10,712	158	14.7	3	28.0	15	140.0	14	130.6
Fulton	10,550	155	14.7	1	9.5	13	123.2	7	66.4
Schenectady	73,450	1,070	14.6	5	6.8	72	98.0	41	55.8
Corning	13,742	200	14.6	8	58.2	7	50.9	6	43.6
Oneida	8,316	118	14.2	4	48.1	3	36.1	9	108.2
Rochester	219,693	3,084	14.0	30	13.7	277	126.1	213	96.9
Geneva	12,458	175	14.0	3	24.1	13	104.4	11	88.2
Mt. Vernon	31,175	433	13.9	3	9.6	34	109.1	20	64.2
Johnstown	10,476	143	13.7	1	9.5	11	105.0	13	124.0
North Tonawanda	12,033	160	13.3	5	41.6	8	66.5	6	49.9
Olean	14,814	188	12.7	0	0	7	47.2	17	114.8
Jamestown	31,523	404	12.8	9	28.5	23	73.0	21	66.6
Hornell	13,637	174	12.8	5	36.6	5	36.7	9	66.0
Tonawanda	8,308	106	12.8	3	36.1	7	84.3	5	60.2
New Rochelle	29,229	342	11.7	1	3.4	21	82.1	23	73.7

Causes in Cities of State

Diseases of the Circulatory System		Pneumonia		Other Respiratory Diseases		Chronic Bright's Disease		Diarrhea Enteritis (Under 2 years)		Violence (Accidents, suicides, etc.)	
Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
16	109.9	30	206.1	19	130.5	3	20.6	98	673.3	41	281.7
222	288.6	115	149.5	109	141.7	113	146.9	67	87.1	79	102.7
35	141.4	34	137.4	45	181.8	23	92.9	54	218.2	21	84.8
25	244.2	10	87.2	17	148.2	21	183.1	17	148.2	23	200.6
58	280.7	19	92.0	18	87.1	35	169.4	27	130.7	26	125.8
279	277.9	126	125.5	97	96.6	139	138.4	56	55.8	96	95.6
25	217.0	21	182.3	10	86.8	24	208.3	4	34.7	17	147.6
21	220.5	17	178.5	5	52.5	10	105.0	9	94.5	30	315.0
51	182.6	50	179.0	26	93.1	48	171.8	25	89.5	36	128.9
71	273.4	26	100.1	17	65.5	24	92.4	12	46.2	33	127.1
12	128.9	10	107.4	4	43.0	7	75.2	5	53.7	19	161.1
40	130.4	37	120.6	29	94.5	24	78.2	45	146.7	70	228.2
34	222.0	18	117.5	16	104.5	23	150.2	1	6.5	31	202.4
54	201.4	29	108.2	24	89.5	24	89.5	20	74.6	37	138.0
19	169.9	11	98.3	11	98.3	2	17.9	7	62.6	7	62.6
142	190.3	101	135.3	79	105.9	77	103.2	100	134.0	75	100.5
26	172.1	23	152.3	22	145.6	17	112.5	11	72.8	11	72.8
39	123.2	54	170.6	32	101.1	34	107.4	89	281.2	36	113.8
34	212.5	8	50.0	25	156.3	19	118.8	16	100.0	12	75.0
67	238.5	31	110.4	23	81.9	39	138.8	21	74.8	34	121.0
49	272.0	20	111.1	20	111.1	15	83.8	11	61.1	24	133.2
29	193.8	11	74.3	10	67.5	26	175.5	6	40.5	19	126.3
43	184.9	19	81.7	11	47.3	36	154.8	18	87.4	31	133.3
899	211.3	110	25.9	761	178.8	277	65.2	264	62.0	345	81.1
18	104.0	25	144.5	9	52.2	21	121.4	23	132.9	29	167.6
10,515	218.7	5,546	115.4	7,132	148.3	4,893	101.8	5,655	117.6	4,863	101.2
4,855	208.8	2,686	115.5	3,719	159.9	2,353	101.2	2,904	124.9	2,727	117.3
896	204.6	462	105.5	431	98.4	356	81.3	316	72.2	346	79.0
3,966	240.7	2,002	121.5	2,546	154.5	1,793	108.8	1,096	121.2	1,393	84.6
583	202.3	296	102.7	325	112.8	279	96.8	335	116.2	298	103.4
215	247.3	100	115.0	111	127.7	112	128.8	104	119.2	99	113.9
81	166.1	62	127.1	39	80.0	65	133.3	39	80.0	54	110.7
41	270.6	16	105.6	14	92.4	12	79.2	7	46.2	10	66.0
31	251.1	19	153.9	10	81.0	13	105.3	11	89.1	16	129.6
30	144.6	16	77.1	19	91.6	30	144.6	14	67.5	17	81.9
293	212.1	144	104.3	121	87.6	160	115.8	166	120.2	162	117.3
175	217.0	75	93.0	85	105.4	65	80.6	180	223.2	56	69.4
63	181.4	40	115.2	29	83.5	34	97.9	36	103.6	28	80.6
63	168.8	33	88.4	30	80.4	89	238.5	14	37.5	45	120.6
20	186.6	9	84.0	11	102.6	6	56.0	2	18.6	15	140.0
14	132.7	9	85.3	6	56.9	7	66.4	7	66.4	14	132.7
84	114.2	108	146.9	74	100.6	63	85.7	115	156.4	74	100.6
20	145.4	18	130.9	9	65.4	10	72.7	4	29.1	17	123.6
14	168.3	7	84.1	7	84.1	4	48.1	5	60.1	10	120.2
415	188.8	153	69.6	254	115.6	251	114.2	203	92.4	180	81.9
27	216.5	12	96.2	11	88.2	13	104.3	4	32.1	14	112.3
61	195.8	31	99.5	34	109.1	42	134.8	36	115.6	22	70.6
12	114.5	18	171.7	6	57.2	10	95.4	7	66.8	5	47.7
7	58.2	8	66.5	18	149.6	4	33.2	21	174.5	13	108.0
22	148.5	16	108.0	6	40.5	8	54.0	9	60.8	18	121.5
47	149.0	30	95.1	23	72.9	43	136.3	8	25.4	22	69.7
26	190.6	14	102.6	3	22.0	9	66.0	4	29.3	15	110.0
11	132.4	7	84.3	6	72.2	3	36.1	5	60.2	14	168.6
25	85.5	22	75.2	25	85.5	33	112.9	23	78.7	34	116.3

Total Mortality by Months

	Annual death rate per 1,000 population	Total deaths	Ages					
			Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
January	14.4	13,158	2,055	1,155	694	2,053	2,835	4,352
February	13.2	12,109	1,851	1,144	681	1,876	2,599	3,935
March	15.7	14,397	2,192	1,296	760	2,250	2,993	4,899
April	14.3	13,085	2,051	1,172	783	2,131	2,734	4,205
May	13.2	12,099	1,960	1,111	739	2,048	2,519	3,704
June	12.1	11,066	2,027	953	683	1,876	2,240	3,274
July	14.3	13,098	3,512	1,205	792	1,965	2,369	3,243
August	13.4	12,238	3,414	1,090	652	1,710	2,252	3,100
September	12.5	11,441	2,781	900	551	1,769	2,207	3,214
October	12.1	11,108	2,312	713	566	1,832	2,325	3,347
November	11.9	10,938	1,537	700	557	1,826	2,487	3,820
December	14.0	12,892	1,765	794	611	2,004	2,997	4,706
Total	16.1	147,629	27,457	12,233	8,069	23,340	30,557	45,799

Total Mortality by Months — (Continued)

	Epidemic Diseases									
	Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis
January	92	7	....	170	226	46	276	153	51	35
February	90	4	1	173	221	40	248	204	71	37
March	96	3	....	219	253	56	271	418	87	45
April	72	5	2	195	223	60	275	260	52	49
May	63	6	1	134	177	68	238	109	59	49
June	71	5	2	138	138	54	198	43	46	41
July	97	6	1	83	73	97	159	15	33	37
August	135	8	....	47	36	103	131	8	19	37
September	191	5	....	36	41	57	108	12	11	28
October	172	10	....	12	53	48	131	30	23	39
November	163	2	....	31	83	45	209	44	31	22
December	132	4	....	47	93	53	189	156	43	33
Total	1,374	65	7	1,285	1,617	727	2,433	1,452	526	452

Total Mortality by Months.—(Continued)

	Pulmonary tuberculosis	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and enteritis (under 2 years)	Diarrhea and enteritis (over 2 years)
January	1,204	184	627	145	386	1,002	1,867	1,249	1,373	223	59
February	1,156	181	584	127	367	926	1,736	1,058	1,199	200	80
March	1,427	214	652	143	462	1,099	1,854	1,429	1,406	224	69
April	1,311	216	622	130	434	969	1,720	1,149	1,277	269	98
May	1,242	216	623	110	423	987	1,670	857	990	337	75
June	1,068	217	595	129	366	877	1,454	524	743	620	112
July	1,180	226	601	100	448	938	1,405	321	641	2,237	283
August	1,085	167	642	118	528	810	1,284	286	524	2,071	331
September	1,078	166	670	117	460	879	1,357	333	623	1,439	241
October	1,066	171	639	117	416	913	1,473	553	731	885	125
November	1,060	163	637	116	370	944	1,656	761	873	320	91
December	1,193	157	630	146	397	1,060	2,021	1,347	1,282	211	83
Total	14,059	2,278	7,522	1,498	5,057	11,404	19,497	9,867	11,662	9,036	1,647

Total Mortality by Months—(Concluded)

	Other diseases of the digestive system	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS	
											Total births	Still births
January	627	891	276	132	416	647	112	42	261	379	18,589	856
February	618	796	266	141	342	487	101	26	248	381	16,108	805
March	661	947	306	166	468	530	132	31	291	438	18,711	925
April	616	874	312	132	397	574	128	30	230	404	17,343	828
May	609	834	256	131	302	591	140	34	247	521	17,590	847
June	629	766	246	142	362	686	148	34	236	376	17,596	840
July	662	740	279	116	370	1,025	153	42	315	415	18,893	816
August	794	718	229	99	420	750	108	42	329	379	18,123	818
September	659	696	218	93	422	624	131	36	301	409	17,910	794
October	629	718	211	99	428	641	113	31	269	373	17,679	786
November	538	830	226	93	316	593	111	46	232	332	17,353	803
December	649	901	275	108	356	547	102	26	223	428	17,340	834
Total	7,691	9,711	3,100	1,452	4,599	7,695	1,479	420	3,182	4,835	213,235	9,952

Detailed Statement as to Causes of Deaths

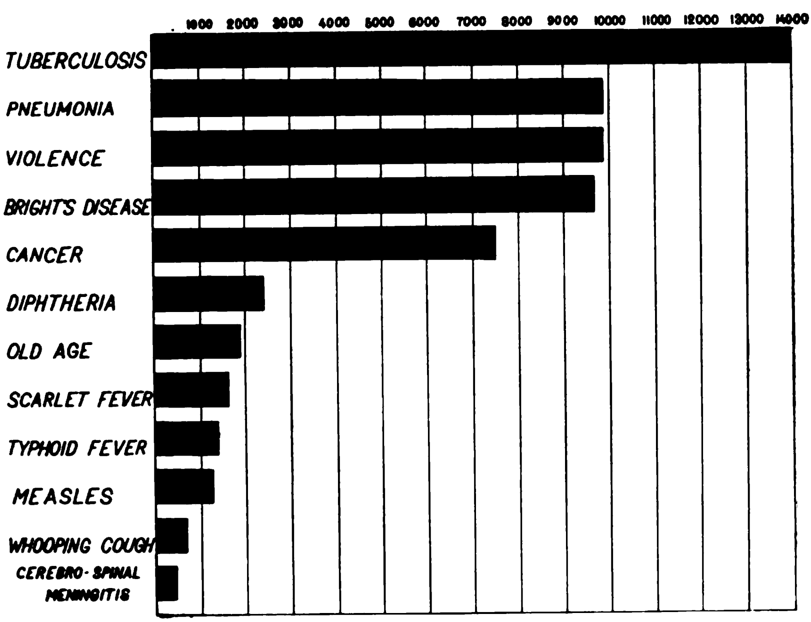
	Jan.	Feb.	Mar.	April	May	June	July
1. All causes	13,158	12,109	14,397	13,085	12,099	11,066	13,098
2. I. General diseases	3,567	3,467	4,301	3,857	3,469	3,070	3,119
3. (A) Epidemic diseases	1,028	1,060	1,415	1,155	865	707	617
4. Typhoid fever	92	90	96	72	63	71	97
5. Typhus fever	.....	.....	.....	.....	.....	.....	.....
6. Relapsing fever	.....	.....	.....	.....	.....	1	.....
7. Malaria	7	4	3	5	6	5	6
8. Smallpox	.....	1	.....	2	1	2	1
9. Measles	170	173	219	195	134	138	83
10. Scarlet fever	226	221	253	223	177	138	73
11. Whooping cough	46	40	56	60	68	54	97
12. (a) Diphtheria	262	239	264	271	236	190	158
13. (b) Croup	14	9	7	4	2	8	1
14. Influenza	153	204	418	260	109	43	15
15. Miliary fever	.....	.....	.....	.....	.....	.....	.....
16. Asiatic cholera	.....	.....	.....	.....	.....	.....	.....
17. Dysentery	6	7	10	9	8	7	53
18. Plague	.....	.....	.....	.....	.....	.....	.....
19. Yellow fever	.....	.....	.....	.....	.....	.....	.....
20. Leprosy	.....	.....	.....	.....	.....	.....	.....
21. Erysipelas	51	71	87	52	59	46	33
22. Other epidemic diseases	1	1	2	2	2	4	.....
23. (B) Other general diseases	2,539	2,407	2,886	2,702	2,604	2,363	2,502
24. Purulent infection and septicemia	25	25	46	34	36	15	30
25. Glanders	.....	.....	1	1	.....	.....	.....
26. Anthrax	3	.....	.....	.....	.....	.....	.....
27. Rabies	.....	.....	1	1	2	.....	1
28. Tetanus	8	9	5	9	9	11	17
29. Pellagra	.....	.....	.....	.....	.....	.....	.....
30. Tuberculosis of lungs	1,204	1,156	1,427	1,311	1,242	1,068	1,180
31. Acute miliary tuberculosis	7	15	27	30	16	14	24
32. Tuberculous meningitis	109	91	93	91	117	108	119
33. Abdominal tuberculosis	27	33	35	32	28	46	33
34. Pott's disease	12	10	16	14	13	15	10
35. White swelling	6	5	3	6	5	2	4
36. Tuberculosis of other organs	17	13	18	32	25	24	27
37. Disseminated tuberculosis	6	14	22	11	12	8	9
38. Rickets	2	14	4	6	5	8	12
39. Syphilis	50	36	51	48	59	55	65
40. Gonococcus infections	5	1	1	3	1	2	.....
41. Cancer of mouth	19	35	25	20	18	21	25
42. Cancer of stomach and liver	253	219	247	246	253	214	238
43. Cancer of peritoneum, intestines and rectum	91	78	95	102	97	101	84
44. Cancer of skin	15	15	16	15	19	13	15
45. Cancer of breast	55	68	76	58	55	52	51
46. Cancer of female genital organs	92	84	84	98	83	109	87
47. Cancer of other or unspecified organs	102	85	109	83	98	85	101
48. Tumor (noncancerous)	9	11	11	6	5	8	20
49. Acute articular rheumatism	48	68	84	81	63	69	17
50. Chronic articular rheumatism	54	47	42	20	13	14	26
51. Chronic rheumatism and gout	5	5	11	37	33	20	18
52. Scurvy	1	1	2	1	.....	1	.....
53. Diabetes	145	127	143	130	110	129	100
54. Exophthalmic goiter	13	11	14	11	10	10	10
55. Addison's disease	2	2	1	4	2	4	3
56. Leukemia	14	10	17	18	14	8	8
57. Anemia, chlorosis*	37	33	40	47	48	44	37
58. Alcoholism	82	68	97	80	87	61	92
59. Chronic lead poisoning	3	.....	5	2	1	.....	4
60. Other chronic occupational poisonings	.....	.....	.....		.....	10	10
61. Other chronic poisonings	3	.....	4	2	1	3	5
62. Other general diseases	15	18	13	12	24	11	20

* Not separately

Comparative Mortality

TWELVE PROMINENT CAUSES OF DEATH

NEW YORK STATE 1910



Occurring in the State During 1910

	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. All causes	12,238	11,441	11,108	10,938	12,892	147,629
2. I. General diseases	3,027	2,952	2,877	2,954	3,240	39,900
3. (A) Epidemic diseases	611	561	524	627	729	9,899
4. Typhoid fever	135	191	172	163	132	1,374
5. Typhus fever	......	......	......	......	......	......
6. Relapsing fever	......	......	......	......	......	1
7. Malaria	8	5	10	2	4	65
8. Smallpox	......	......	......	......	......	7
9. Measles	47	36	12	31	47	1,285
10. Scarlet fever	36	41	53	83	93	1,617
11. Whooping cough	103	57	38	45	53	727
12. (a) Diphtheria	129	103	123	195	180	2,350
13. (b) Croup	2	5	8	14	9	83
14. Influenza	8	12	30	44	156	1,452
15. Miliary fever	......	......	......	......	......	......
16. Asiatic cholera	......	......	......	......	......	......
17. Dysentery	123	99	45	18	10	395
18. Plague	......	......	......	......	......	......
19. Yellow fever	......	......	......	......	......	......
20. Leprosy	......	......	......	......	......	......
21. Erysipelas	19	11	23	31	43	526
22. Other epidemic diseases	......	1	......	1	2	17
23. (B) Other general diseases	2,416	2,391	2,353	2,327	2,511	30,001
24. Purulent infection and septicemia						
25. Glanders	13	16	22	13	21	301
26. Anthrax	......	1	......	1	......	4
27. Rabies	......	......	......	......	1	4
28. Tetanus	2	......	......	......	......	7
29. Pellagra	16	11	5	4	7	111
30. Tuberculosis of lungs	......	......	1	......	1	2
31. Acute miliary tuberculosis	1,085	1,078	1,055	1,060	1,193	14,059
32. Tuberculous meningitis	18	22	16	19	20	228
33. Abdominal tuberculosis	78	76	86	82	75	1,125
34. Pott's disease	33	32	33	23	30	385
35. White swelling	6	7	4	6	12	125
36. Tuberculosis of other organs	1	2	......	......	......	34
37. Disseminated tuberculosis	22	22	26	22	16	264
38. Rickets	9	5	6	11	4	117
39. Syphilis	17	8	6	4	7	93
40. Gonococcus infections	64	48	50	40	59	625
41. Cancer of mouth	1	7	3	2	5	31
42. Cancer of stomach and liver	26	24	25	19	28	285
43. Cancer of peritoneum, intestines and rectum	272	265	243	241	242	2,933
44. Cancer of skin	93	108	99	97	86	1,121
45. Cancer of breast	14	17	16	20	17	192
46. Cancer of female genital organs	59	74	60	58	66	732
47. Cancer of other or unspecified organs*	90	85	98	100	86	1,096
48. Tumor (noncancerous)*	98	97	98	102	105	1,163
49. Acute articular rheumatism	12	10	14	9	6	121
50. Chronic articular rheumatism	49	41	23	35	52	630
51. Chronic rheumatism and gout	16	25	17	19	21	314
52. Scurvy	29	17	38	25	27	265
53. Diabetes	2	......	3	......	......	11
54. Exophthalmic goiter	118	117	117	116	146	1,498
55. Addison's disease	7	8	6	13	14	127
56. Leukemia	3	5	1	4	1	32
57. Anemia, chlorosis*	11	15	11	8	13	147
58. Alcoholism	29	36	42	33	34	460
59. Choronic lead poisoning	72	77	87	95	92	990
60. Other chronic occupational poison-	1	2	4	3	1	26
ings	......	......	......	......	......	20
61. Other chronic poisonings	16	11	2	1	13	61
62. Other general diseases	39	22	36	42	10	262

classified till July.

Detailed Statement as to Causes of Deaths Occurring

	Jan.	Feb.	Mar.	April	May	June	July
63. II. Diseases of nervous system	1,037	963	1,144	1,018	1,036	918	975
64. Encephalitis*	4	1	5	4	4	2	9
65. Simple meningitis	64	78	99	87	83	60	85
66. Cerebrospinal fever	35	37	45	49	49	41	37
67. Locomotor ataxia	20	17	20	10	13	17	14
68. Other diseases of spinal cord	39	32	39	47	34	34	51
69. Apoplexy, cerebral hemorrhage	511	483	532	450	490	443	400
70. Softening of brain	13	14	16	15	23	14	13
71. Paralysis without specified cause	104	76	119	105	101	84	106
72. General paralysis of insane	39	34	48	42	42	61	50
73. Other forms of mental alienation	12	11	17	16	18	7	17
74. Other diseases of brain	.....	.....	5	1	2	6	11
75. Epilepsy	31	31	27	34	32	18	22
76. Convulsions (nonpuerperal)*	2	4	1	2	3	3	1
77. Convulsions of infants*	89	70	97	74	83	61	89
78. Chorea	1	1	4	1	3	3	4
79. Other diseases of nervous system	48	60	48	56	39	41	56
80. Diseases of the eye and its adnexa	.....	.....	.....	1	.....	1	3
81. Diseases of the ear	25	14	22	24	17	22	6
82. Anterior poliomyelitis	.....	.....	.....	.....	.....	.....	1
83. III. Diseases of circulatory system	1,867	1,736	1,854	1,720	1,670	1,454	1,405
84. Pericarditis	12	6	13	12	10	12	13
85. Acute endocarditis	262	249	320	258	227	185	186
86. Organic disease of the heart	1,103	1,041	1,037	982	1,009	912	823
87. Angina pectoris	61	64	49	71	72	53	48
88. Diseases of the arteries	326	300	329	306	266	217	228
89. Embolism and thrombosis	63	42	41	43	41	38	84
90. Diseases of the veins	6	8	8	8	4	8	7
91. Diseases of the lymphatic system	5	5	2	2	6	3	2
92. Hemorrhages (except of lungs)*	15	12	16	18	9	6	6
93. Other diseases of circulatory system	14	9	39	20	26	20	8
94. IV. Diseases of respiratory system	2,622	2,257	2,835	2,426	1,847	1,267	962
95. Diseases of nasal fossae*	.....	.....	.....	.....	.....	.....	.....
96. Diseases of the larynx	13	8	14	8	13	14	6
97. Diseases of the thyroid body	3	3	1	6	2	1	2
98. Acute bronchitis	204	176	203	178	118	100	68
99. Chronic bronchitis	107	106	99	106	90	40	48
100. Broncho-pneumonia	879	787	897	796	598	461	387
101. Pneumonia	1,249	1,058	1,429	1,149	857	524	321
102. Pleurisy	58	45	69	60	65	65	34
103. Pulmonary congestion	34	23	39	32	18	16	31
104. Gangrene of lungs	6	.....	7	2	3	3	.....
105. Asthma	22	22	29	28	13	17	16
106. Pulmonary emphysema	11	2	9	13	8	7	9
107. Other diseases of the respiratory system	36	27	39	48	62	19	40
108. V. Disease of digestive system	909	898	054	983	1,021	1,361	3,182
109. Diseases of the mouth and its adnexa	.....	5	4	8	5	7	2
110. Diseases of pharynx	13	12	19	20	20	11	11
111. Diseases of the esophagus	3	2	6	3	2	2	2
112. Ulcer of stomach	25	39	29	34	34	25	36
113. Other diseases of the stomach (cancer excepted)	104	92	123	88	103	89	87
114. Diarrhea and enteritis (under 2 years)	223	200	224	269	337	620	2,237
115. Diarrhea and enteritis (2 years and over)	59	80	69	98	75	112	283
116. Intestinal parasites	.....	.....	.....	.....	1	1	4
117. Hernia	69	71	76	58	47	66	78
118. Obstruction of intestines	23	34	59	32	40	49	34
119. Appendicitis and typhilitis	81	76	72	85	68	88	125
120. Other diseases of intestines	30	18	18	24	14	21	30
121. Acute yellow atrophy of liver	7	4	4	2	8	2	3
122. Hydatid tumor of liver	3	3	.....	.....	1	1	4
123. Cirrhosis of liver	182	151	147	149	146	138	123
124. Biliary calculi	16	18	18	22	17	12	16
125. Other diseases of liver	29	36	41	25	33	36	29

* Not separately

in the State During 1910 — (Continued)

	Aug.	Sept.	Oct.	Nov.	Dec.	Total
63. II. Diseases of nervous system	847	907	952	966	1,093	11,856
64. Encephalitis*	8	2	4	8	7	58
65. Simple meningitis	83	64	61	43	82	889
66. Cerebrospinal fever	37	28	39	22	33	452
67. Locomotor ataxia	17	22	26	19	16	211
68. Other diseases of spinal cord	56	34	52	39	50	507
69. Apoplexy, cerebral hemorrhage	380	402	454	485	526	5,556
70. Softening of brain	11	24	7	21	20	191
71. Paralysis without specified cause*	77	98	77	88	109	1,144
72. General paralysis of insane	32	40	44	56	50	538
73. Other forms of mental alienation	13	17	13	14	18	173
74. Other diseases of brain	5	7	3	5	14	59
75. Epilepsy	36	24	32	37	44	368
76. Convulsions (nonpuerperal)*	......	3	4	2	2	27
77. Convulsions of infants*	52	58	52	49	65	839
78. Chorea	1	5	......	1	1	25
79. Other diseases of nervous system	37	43	45	50	38	561
80. Diseases of the eye and its adnexa	......	1	2	1	......	9
81. Diseases of the ear	2	14	16	15	14	191
82. Anterior poliomyelitis	......	21	21	11	4	58
83. III. Diseases of circulatory system	1,284	1,357	1,473	1,656	2,021	19,497
84. Pericarditis	5	7	9	11	10	120
85. Acute endocarditis	136	109	108	104	121	2,265
86. Organic diseases of the heart	801	867	1,020	1,107	1,413	12,115
87. Angina pectoris	43	53	40	55	64	673
88. Diseases of the arteries	253	264	238	319	317	3,363
89. Embolism and thrombosis	25	31	33	31	51	523
90. Diseases of the veins	4	3	7	2	10	75
91. Diseases of the lymphatic system	3	3	1	1	3	36
92. Hemorrhages (except of lungs)*	3	6	6	5	2	104
93. Other diseases of circulatory system	11	14	11	21	30	223
94. IV. Diseases of respiratory system	810	956	1,284	1,634	2,629	21,529
95. Diseases of nasal fossae*	......	1	......	......	......	1
96. Diseases of the larynx	7	7	7	11	13	121
97. Diseases of the thyroid body	2	1	1	2	2	26
98. Acute bronchitis	75	92	101	113	170	1,598
99. Chronic bronchitis	35	38	64	71	114	918
100. Broncho pneumonia	319	376	442	509	797	7,248
101. Pneumonia	286	333	553	761	1,347	9,867
102. Pleurisy	34	30	42	41	44	587
103. Pulmonary congestion	18	21	28	35	38	333
104. Gangrene of lungs	2	2	2	2	4	33
105. Asthma	7	21	10	23	29	237
106. Pulmonary emphysema	7	10	6	9	18	109
107. Other diseases of the respiratory system	18	24	28	57	53	451
108. V. Diseases of digestive system	3,196	2,339	1,639	949	943	18,374
109. Diseases of the mouth and its adnexa	7	5	5	4	1	53
110. Diseases of pharynx	9	7	14	12	15	163
111. Diseases of the esophagus	2	6	......	......	2	30
112. Ulcer of stomach	38	19	46	35	36	396
113. Other diseases of the stomach (cancer excepted)	116	113	103	73	99	1,190
114. Diarrhea and enteritis (under 2 years)	2,071	1,439	885	320	211	9,036
115. Diarrhea and enteritis (2 years and over)	331	241	125	91	83	1,647
116. Intestinal parasites	24	40	1	......	2	51
117. Hernia	66	23	39	10	84	687
118. Obstruction of intestines	59	46	45	70	46	537
119. Appendicitis and typhilitis	102	74	83	66	68	988
120. Other diseases of intestines	35	25	27	15	13	270
121. Acute yellow atrophy of liver	24	4	2	2	2	42
122. Hydatid tumor of liver	......	1	1	2	......	16
123. Cirrhosis of liver	178	146	126	143	172	1,801
124. Biliary calculi	11	19	11	20	23	203
125. Other diseases of liver	28	38	40	31	29	395

classified till July.

Detailed Statement as to Causes of Deaths Occurring

	Jan.	Feb.	Mar.	April	May	June	July
V. Diseases of digestive system—(*Con.*)							
126. Diseases of the spleen		2	3	.....	2	1	10
127. Simple peritonitis (nonpuerperal)	30	33	29	38	32	51	25
128. Other diseases of digestive system (cancer and tuberculosis excepted)	10	22	13	28	36	29	43
129. VI. Diseases of genito-urinary system	1,167	1,062	1,253	1,186	1,090	1,012	1,019
130. Acute nephritis	139	148	161	152	116	113	121
131. Bright's disease	891	796	947	874	834	766	740
132. Other diseases of kidneys and adnexa	23	11	26	18	23	17	22
133. Calculi of urinary passage	3	7	10	4	13	9	5
134. Diseases of bladder	40	41	41	46	21	28	42
135. Other diseases of urethra, urinary abscess, etc	.....	2	6	5	7	4	1
136. Diseases of prostate	26	18	19	30	14	19	22
137. Nonvenereal diseases of the male genital organs	2	1	3	.....	1	2	1
138. Metritis	2	3	2	3	1	1	1
139. Uterine hemorrhage (nonpuerperal)	.....	2	.....	1	2	.....	.....
140. Uterine tumor (noncancerous)	10	9	12	18	17	16	18
141. Other diseases of uterus	6	3	4	5	9	9	11
142. Cysts and other tumors of the ovary	3	4	4	8	15	6	6
143. Salpingitis and other diseases of female genital organs	22	17	18	22	16	22	29
144. Nonpuerperal diseases of the breast (cancer excepted)	.....	.....	.....	.....	1	.....	.....
145. VII. Childbirth	132	141	166	132	131	142	116
146. Accidents of pregnancy	29	30	35	36	32	28	22
147. Puerperal hemorrhage	6	11	9	9	11	18	18
148. Other accidents of labor	14	12	13	11	16	6	10
149. Puerperal septicemia	53	55	68	56	43	49	24
150. Puerperal albuminuria and convulsions	26	24	24	18	22	28	26
151. Puerperal phlegmasia alba dolens, embolus following childbirth (not otherwise defined)	3	9	17	2	7	13	16
152. Puerperal diseases of the breast	1	.....	.....	.....	.....	.....	.....
153. VIII. Diseases of the skin	60	56	75	55	53	55	57
154. Gangrene	33	32	37	28	29	35	32
155. Furuncle	1	5	5	8	3	3	5
156. Acute abscess	21	13	27	13	16	6	10
157. Other diseases of the skin	5	6	6	6	5	11	†10
158. IX. Diseases of locomotor system	29	17	43	42	14	19	21
159. Diseases of bones (tuberculosis excepted)	27	16	40	41	10	17	21
160. Diseases of joints (tuberculosis and rheumatism excepted)	1	1	2	1	1	1	.....
161. Amputation	.....	.....	.....	.....	.....	.....	.....
162. Other diseases of organs of locomotion	1	.....	1	.....	3	1	.....
163. X. Congenital malformations (still births not included)	115	126	124	96	114	107	98
164. XI. Diseases of early infancy	583	519	647	590	612	538	576
165. Premature birth	148	147	136	168	274	135	153
166. Congenital debility, icterus and sclerema	416	342	468	397	302	362	370
167. Other diseases of early infancy	19	29	40	24	36	40	46
168. Lack of care	.....	1	3	1	.....	1	7
169. XII. Old age senility	195	178	201	156	165	149	148
170. XIII. Violence	809	619	710	750	795	887	1,253
171. Suicide by poison	29	28	29	20	27	18	31
172. Suicide by asphyxia	20	22	20	19	22	30	21
173. Suicide by hanging or strangulation	14	11	22	23	27	28	29
174. Suicide by drowning	5	1	11	10	8	7	11
175. Suicide by firearms	33	28	37	39	35	42	40
176. Suicide by cutting instruments	6	5	10	12	13	9	7

* Not separately classified

in the State During 1910 — (Continued)

	Aug.	Sept.	Oct.	Nov.	Dec.	Total
V. Diseases of digestive system—(*Con.*)						
126. Diseases of the spleen	......	......	......	1	......	21
127. Simple peritonitis (nonpuerperal)	38	23	39	35	30	403
128. Other diseases of digestive system (cancer and tuberculosis excepted)	101	70	47	19	27	445
129. VI. Diseases of genito-urinary system	947	914	929	1,056	1,176	12,811
130. Acute nephritis	112	89	100	100	155	1,506
131. Bright's disease	718	696	718	830	*901	9,711
132. Other diseases of kidneys and adnexa	15	16	17	16	22	226
133. Calculi of urinary passage	6	8	2	3	3	73
134. Diseases of bladder	31	34	23	36	30	413
135. Other diseases of urethra, urinary abscess, etc	3	2	2	5	2	39
136. Disease of prostate	17	24	23	18	20	250
137. Nonvenereal diseases of the male genital organs	1	......	......	1	2	14
138. Metritis	......	1	1	......	2	17
139. Uterine hemorrhage (nonpuerperal)	2	3	1	......	......	11
140. Uterine tumor (noncancerous)	13	12	14	12	20	171
141. Other diseases of uterus	10	6	11	7	3	84
142. Cysts and other tumors of the ovary	5	9	4	8	6	78
143. Salpingitis and other diseases of female genital organs	14	13	13	20	10	216
144. Nonpuerperal diseases of the breast (cancer excepted)	......	1	......	......	......	2
145. VII. Childbirth	99	93	99	93	108	1,452
146. Accidents of pregnancy	15	14	29	26	13	309
147. Puerperal hemorrhage	10	10	16	8	10	136
148. Other accidents of labor	6	10	7	4	11	120
149. Puerperal septicemia	37	26	24	32	31	498
150. Puerperal albuminuria and convulsions	25	27	18	17	29	284
151. Puerperal phlegmasia alba dolens, embolus following childbirth (not otherwise defined)	6	6	5	6	9	99
152. Puerperal diseases of the breast	......	......	......	......	5	6
153. VIII. Diseases of the skin	46	43	41	64	49	654
154. Gangrene	22	20	20	32	28	348
155. Furuncle	7	5	5	3	7	57
156. Acute abscess	12	11	6	24	8	167
157. Other diseases of the skin	5	7	10	5	6	82
158. IX. Diseases of locomotor system	22	19	9	19	18	272
159. Diseases of bones (tuberculosis excepted)	21	18	8	16	16	251
160. Diseases of joints (tuberculosis and rheumatism excepted)	1	......	1	3	1	13
161. Amputation	......	......	......	......	1	1
162. Other diseases of organs of locomotion	......	1	......	......	......	7
163. X. Congenital malformations (still births not included)	92	122	105	89	131	1,319
164. XI. Diseases of early infancy	622	626	607	461	556	6,937
165. Premature birth	150	162	126	107	145	1,851
166. Congenital debility, icterus and sclerema*	420	422	428	316	356	4,599
167. Other diseases of early infancy	51	39	50	37	53	464
168. Lack of care	1	3	3	1	2	23
169. XII. Old age—senility	147	142	138	163	169	1,951
170. XIII. Violence	917	812	824	765	705	9,846
171. Suicide by poison	21	33	20	19	15	290
172. Suicide by asphyxia	17	25	24	23	24	267
173. Suicide by hanging or strangulation	20	12	22	17	13	238
174. Suicide by drowning	6	8	6	9	35	117
175. Suicide by firearms	33	30	30	29	11	387
176. Suicide by cutting instruments	5	11	7	8	4	97

*till July. † Mycosis.

Detailed Statement as to Causes of Deaths Occurring

	Jan.	Feb.	Mar.	April	May	June	July
XIII. Violence — (*Continued*)							
177. Suicide by jumping from high places..	3	3	3	4	5	11	13
178. Suicide by crushing..............	.....	.....	.....	1	2	2	1
179. Other suicides..................	2	3	.....	.....	1	1	.....
180. Poisoning by food................	.....	1	4	8	3	5	3
181. Other acute poisonings............	23	16	13	16	9	10	13
182. Conflagration..................	5	10	5	6	16	6	6
183. Burns (conflagration excepted)	90	52	53	58	49	38	57
184. Inhalation of poisonous gases........	65	50	31	42	34	18	13
185. Fractures.....................	55	48	61	62	38	65	60
186. Accidental drowning..............	14	13	40	65	103	129	272
187. Dislocations....................	2	3	1	.....	.....	3	2
188. Heat and sunstroke..............	.....	.....	.....	.....	.....	30	136
189. Cold and freezing................	19	13	4	1	.....	.....	.....
190. Lightning.....................	.....	.....	.....	.....	1	1	5
191. Electricity (lightning excepted)......	6	2	3	8	9	13	14
192. Starvation, privation, etc...........	1	.....	2	.....	.....	.....	2
193. Accidental gunshot wounds..........	5	5	3	6	2	5	16
194. Injuries by machinery.............	11	3	18	9	11	16	16
195. Injuries in mines and quarries.......	3	2	2	1	.....	.....	.....
196. Railroad accidents and injuries......	76	60	91	86	147	108	157
197. Injuries by horses and vehicles.......	35	8	26	39	23	47	54
198. Other accidential traumatisms.......	177	134	121	117	99	141	158
199. Suffocation....................	6	21	6	7	6	5	4
200. Injuries at birth................	54	46	46	43	41	46	37
201. Homicide by firearms..............	35	22	15	18	16	16	24
202. Homicide by cutting and piercing instruments...................	6	.....	3	8	4	5	5
203. Homicide by other means..........	1	4	13	4	14	13	13
204. Other external violence............	8	5	17	18	30	19	33
205. XIV. Ill-defined diseases............	66	70	90	74	82	87	167
206. Dropsy.......................	1	3	5	3	3	3	2
207. Sudden death..................	.....	.....	.....	.....	3	.....	10
208. Heart failure..................	5	6	12	7	9	2	12
209. Inanition.....................	8	2	4	6	2	1	2
210. Debility (over 3 months)..........	.....	.....	.....	1	.....	.....	.....
211. Marasmus.....................	41	11	67	50	58	80	97
212. Fever........................	.....	.....	1	.....	.....	.....	1
213. Other ill-defined diseases..........	9	47	.....	4	6	.....	39
214. Unknown.....................	2	1	1	3	1	1	4

* Not separately

in the State During 1910 — (Continued)

		Aug.	Sept.	Oct.	Nov.	Dec.	Total
	XIII. Violence—(*Continued*)						
177.	Suicide by jumping from high places	4	7	4	4	......	61
178.	Suicide by crushing	......	1	......	......	......	7
179.	Other suicides	2	4	......	2	......	15
180.	Poisoning by food	15	7	8	3	3	60
181.	Other acute poisonings	13	10	17	16	16	172
182.	Conflagration	2	4	12	14	13	99
183.	Burns (conflagration excepted)	39	22	73	65	69	665
184.	Inhalation of posionous gases	18	22	32	50	50	425
185.	Fractures	76	61	67	71	52	716
186.	Accidental drowning	142	97	84	31	27	1,017
187.	Dislocations	......	2	3	......	......	16
188.	Heat and sunstroke	17	9	......	......	......	192
189.	Cold and freezing	......	......	1	......	9	47
190	Lightning	7	2	......	......	......	16
191.	Electricity (lightning excepted)	14	7	7	3	4	90
192.	Starvation, privation, etc	......	......	1	......	......	6
193.	Accidental gunshot wounds	6	7	15	7	4	81
194.	Injuries by machinery	9	11	11	13	12	140
195.	Injuries in mines and quarries	4	4	4	5	......	25
196.	Railroad accidents and injuries	167	173	133	146	126	1,470
197.	Injuries by horses and vehicles	34	36	29	15	6	352
198.	Other accidental traumatisms	131	106	98	110	107	1,499
199.	Suffocation	6	1	4	5	9	80
200.	Injuries at birth	50	43	42	39	40	527
201.	Homicide by firearms	23	17	16	26	16	244
202.	Homicide by cutting and piercing instruments	7	6	7	8	4	63
203.	Homicide by other means	12	13	8	12	6	113
204.	Other external violence	17	21	39	15	30	252
205.	XIV. Ill-defined diseases	182	159	131	69	54	1,231
206.	Dropsy*	1	3	3	2	1	30
207.	Sudden death	2	......	......	......	1	16
208.	Heart failure	12	11	9	8	9	102
209.	Inanition	......	6	6	3	2	42
210.	Debility (over 3 months)	......	......	......	......	......	1
211.	Marasmus	155	127	100	49	31	866
212.	Fever	2	......	2	......	......	6
213.	Other ill-defined diseases	4	11	9	5	10	144
214.	Unknown	6	1	2	2	......	24

classified till July.

Total Mortality for the Year

SANITARY DISTRICTS	Population U. S. census July 1, 1910	Total deaths	AGES: Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
MARITIME DISTRICT:								
City of New York:								
BOROUGH OF MANHATTAN	2,341,312	38,668	8,938	4,110	2,077	6,935	8,966	7,642
BOROUGH OF THE BRONX	437,791	6,968	1,050	577	460	1,650	1,707	1,524
BOROUGH OF BROOKLYN	1,646,285	25,676	5,054	2,894	1,623	4,387	5,566	6,141
BOROUGH OF QUEENS	287,725	3,971	879	391	246	663	835	956
BOROUGH OF RICHMOND	86,526	1,467	281	104	80	245	301	456
Total	4,799,639	76,750	16,202	8,076	4,486	13,880	17,375	16,719
Freeport, village (Nassau Co.)	4,871	46	11	0	1	6	11	17
Hempstead, town (Nassau Co.)	36,127	457	104	35	29	60	69	159
North Hempstead, town (Nassau Co.)	17,989	278	68	27	17	47	44	72
Oyster Bay, town (Nassau Co.)	21,857	311	61	33	12	27	47	130
Rockville Center, village (Nassau Co.)	3,710	41	5	2	0	3	10	20
Amityville, village (Suffolk Co.)	2,520	67	2	1	5	8	13	35
Babylon, village (Suffolk Co.)	2,610	41	8	2	1	6	4	20
Brookhaven, town (Suffolk Co.)	12,923	202	19	9	14	18	41	101
Greenport, village (Suffolk Co.)	3,107	48	12	3	2	3	10	18
Huntington, town (Suffolk Co.)	12,082	166	34	5	10	15	27	75
Patchogue, village (Suffolk Co.)	3,840	50	7	4	2	6	9	22
Sag Harbor, village (Suffolk Co.)	3,423	53	13	1	2	6	7	24
Southold, town (Suffolk Co.)	7,539	77	15	5	3	9	12	33
Rest of county	48,445	699	111	35	38	90	143	282
Dobbs Ferry, village (Westchester Co.)	3,453	72	13	5	10	13	12	19
Greenburgh, town (Westchester Co.)	5,308	79	25	9	2	9	12	22
Hastings-on-Hudson, vil. (West. Co.)	4,615	57	22	12	3	7	6	7
Irvington, village (Westchester Co.)	2,313	24	3	2	3	3	4	9
Mamaroneck, town (Westchester Co.)	5,601	89	18	3	6	14	15	32
Mount Vernon (Westchester Co.)	31,175	433	84	35	25	60	101	126
New Rochelle (Westchester Co.)	29,229	342	65	38	24	43	64	108
North Tarrytown, village (Westchester Co.)	5,449	79	24	6	7	9	15	18
Ossining, village (Westchester Co.)	11,612	167	25	19	14	29	27	52
Peekskill, village (Westchester Co.)	15,332	280	42	28	21	46	63	80
Port Chester, village (Westchester Co.)	12,877	209	50	33	8	24	38	54
Rye, town (Westchester Co.)	6,845	49	7	5	3	6	16	12
Tarrytown, village (Westchester Co.)	5,609	84	8	5	4	15	19	32
White Plains, village (Westchester Co.)	16,132	281	59	15	21	53	53	79
Yonkers (Westchester Co.)	80,589	1,226	321	115	54	240	215	278
Rest of County	49,211	864	101	56	42	140	191	330
Totals for the district	5,266,032	83,621	17,539	8,624	4,869	14,895	18,673	18,988
HUDSON VALLEY DISTRICT:								
Albany (Albany Co.)	100,358	1,943	257	102	102	319	496	666
Cohoes (Albany Co.)	24,737	509	128	74	40	63	88	116
Green Island, village (Albany Co.)	4,732	71	11	5	8	10	20	16
Watervliet (Albany Co.)	15,099	261	49	22	12	38	57	80
Rest of county	28,871	444	67	23	22	42	71	217
Hudson (Columbia Co.)	11,462	236	38	5	14	46	40	93
Rest of county	32,230	532	65	10	18	53	89	290
Fishkill, town (Dutchess Co.)	3,214	58	16	4	3	5	9	19
Fishkill Landing, village (Dutchess Co.)	3,901	67	14	7	3	11	15	17
Matteawan, village (Dutchess Co.)	6,749	122	17	4	5	16	31	48
Poughkeepsie (Dutchess Co.)	28,055	466	76	17	25	50	95	203
Wappingers Falls, village (Dutchess Co.)	3,179	51	6	4	6	5	10	20
Rest of county	42,718	716	86	29	31	79	114	373
Catskill, village (Greene Co.)	5,296	96	19	5	7	10	17	38
Coxsackie, town (Greene Co.)	3,592	72	15	1	3	7	15	31
Rest of county	21,293	359	40	8	17	43	71	176
Goshen, town (Orange Co.)	5,151	124	7	9	4	9	36	59
Middletown (Orange Co.)	15,297	275	21	12	14	56	49	123
Montgomery, town (Orange Co.)	3,459	47	9	0	1	6	10	21
Newburgh (Orange Co.)	27,868	510	76	35	34	81	96	188
Port Jervis	9,304	170	25	7	13	25	34	65

1910 *in the Sanitary Districts* — (Continued)

SANITARY DISTRICTS	EPIDEMIC DISEASES: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
MARITIME DISTRICT:											
City of New York:											
BOROUGH OF MANHATTAN	269	7	4	271	448	154	898	162	233	177	3,976
BOROUGH OF THE BRONX	41	3	....	45	75	23	136	26	16	29	1,779
BOROUGH OF BROOKLYN	198	13	1	422	384	92	558	144	72	72	2,429
BOROUGH OF QUEENS	39	3	....	30	33	21	104	24	5	12	358
BOROUGH OF RICHMOND	11	....	....	6	12	4	19	10	3	4	148
Totals	558	26	5	774	952	294	1,715	366	329	294	8,690
Freeport, village (Nassau Co.)	1										6
Hempstead, town (Nassau Co.)	2	1			7	2	5	3	2	1	32
North Hempstead, town (Nassau Co.)	3	1			2	2	4	1	1		7
Oyster Bay, town (Nassau Co.)				2		2	4	4	4	1	23
Rockville Center, village (Nassau Co.)							1	1	1		2
Amityville, village (Suffolk Co.)	1						2				4
Babylon, village (Suffolk Co.)						2		1	1	1	3
Brookhaven, town (Suffolk Co.)	1			4		2	1	5	1		22
Greenport, village (Suffolk Co.)	4			2	1						3
Huntington, town (Suffolk Co.)	1	1		2		1	1	5	1		8
Patchogue, village (Suffolk Co.)				1	4			1			2
Sag Harbor, village (Suffolk Co.)				1		1		4			3
Southold, town (Suffolk Co.)	1				2	1		1			9
Rest of county	5			3	3	6	7	12	3		48
Dobbs Ferry, village (Westchester Co.)								1			4
Greenburgh, town (Westchester Co.)				1			1				6
Hastings-on-Hudson, vil. (West. Co.)					5	1	2				8
Irvington, village (Westchester Co.)											2
Mamaroneck, town (Westchester Co.)							1				9
Mount Vernon (Westchester Co.)	3			1	2	4	6	4			34
New Rochelle (Westchester Co.)	1			6		8	8	1	1		24
North Tarrytown, village (West. Co.)					2		1			1	9
Ossining, village (Westchester Co.)	2			6			3	1			15
Peekskill, village (Westchester Co.)	4	1		9	2	3		2	3		23
Port Chester, vil. (Westchester Co.)	2			4		5	6	2		1	9
Rye, town (Westchester Co.)								1			2
Tarrytown, village (Westchester Co.)	1			1	1	1	1	1			6
White Plains, vil. (Westchester Co.)	5	1			1	1	3	1	1		16
Yonkers (Westchester Co.)	15	1			18	8	28	5	2	1	120
Rest of county	6	3		1	7	8	5	10	3		116
Totals for the district	616	35	5	818	1,009	352	1,805	438	351	300	9,265
HUDSON VALLEY DISTRICT:											
Albany (Albany Co.)	15			24	9	9	17	29	4		239
Cohoes (Albany Co.)	19			3	32	1	13	4	1	3	49
Green Island, village (Albany Co.)					6			1		1	8
Watervliet (Albany Co.)	7			6	2		2	3			21
Rest of county	3			4	2	1	2	9			27
Hudson (Columbia Co.)	6					1	2			1	26
Rest of county	6					2	1	17	1		36
Fishkill, town (Dutchess Co.)							2	1			3
Fishkill Landing, vil. (Dutchess Co.)	1	1						1			6
Matteawan, village (Dutchess Co.)								4			10
Poughkeepsie (Dutchess Co.)	5			1		5	1	2	2	2	35
Wappingers Falls, vil. (Dutchess (Co.)		1					4				7
Rest of county	7	1		2	3	2	3	5	2	1	65
Catskill, village (Greene Co.)	3										15
Coxsackie, town (Greene Co.)								1	1		6
Rest of county	8			3		2	1	4	1		43
Goshen, town (Orange Co.)	2				1	2			1	1	11
Middletown (Orange Co.)	4				3		2	1		1	27
Montgomery, town (Orange Co.)											1
Newburgh (Orange Co.)	12			6	9	1	5	5		4	50
Port Jervis (Orange Co.)	6				11		1	6			11

Total Mortality for the Year 1910 *in*

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and Enteritis: Under 2 years	Diarrhea and Enteritis: Over 2 years	Other diseases of the digestive system
MARITIME DISTRICT:											
City of New York:											
Borough of Manhattan	815	1,915	379	1,392	1,562	4,855	2,686	3,719	2,904	318	1,735
Borough of the Bronx	116	323	66	155	379	896	462	431	316	81	235
Borough of Brooklyn	384	1,212	270	799	815	3,966	2,002	2,546	1,996	250	1,192
Borough of Queens	48	185	32	103	173	583	296	325	335	55	152
Borough of Richmond	21	74	21	30	67	215	100	111	104	9	78
Totals	1,384	3,709	768	2,479	2,996	10,515	5,546	7,132	5,655	713	3,392
Freeport, village (Nassau Co.)	....	6	....	3	5	5	1	1	6	....	3
Hempstead, town (Nassau Co.)	4	27	5	15	39	39	23	20	34	6	32
North Hempstead, town (Nassau Co.)	5	10	1	13	21	22	21	17	29	6	20
Oyster Bay, town (Nassau Co.)	5	17	3	4	41	32	21	20	20	5	18
Rockville Center, village (Nassau Co.)	....	2		1	5	8	1	2	3	1	1
Amityville, village (Suffolk Co.)	....	7	....	2	20	4	5	2	1	....	1
Babylon, village (Suffolk Co.)	....	3		2	5	4	4	1	....	1	2
Brookhaven, town (Suffolk Co.)	....	12		5	36	24	8	7	7	5	7
Greenport, village (Suffolk Co.)	1	1	1	2	2	4	1	6	1	....	7
Huntington, town (Suffolk Co.)	4	7		5	17	28	13	5	8	3	7
Patchogue, village (Suffolk Co.)		11	1	1	5	5	7		1	1	1
Sag Harbor, village (Suffolk Co.)	1	1	1		11	4	2	7	2	....	3
Southold, town (Suffolk Co.)		6		7	10	4	6	4	6	....	1
Rest of county	6	31	7	22	114	66	38	65	38	12	32
Dobbs Ferry, village (West. Co.)	1	3	1	2	2	7	2	1	4	4	9
Greenburgh, town (Westchester Co.)		6	2		8	8	4	9	7	2	2
Hastings-on-Hudson, vil. (West. Co.)	....	1	1		2	2	3	5	14	2	....
Irvington, village (Westchester Co.)	....	1	1		2	4	1	2	....	1	1
Mamaroneck, town (Westchester Co.)	1	5	1	2	8	10	7	5	9	1	6
Mount Vernon (Westchester Co.)	11	20	5	9	36	61	31	34	36	6	24
New Rochelle (Westchester Co.)	6	23	4	10	27	25	22	25	23	3	14
North Tarrytown, village (West. Co.)		3		1	4	6	10	8	6	2	2
Ossining, village (Westchester Co.)	5	7		6	15	19	11	11	6	....	8
Peekskill, village (Westchester Co.)	6	13	3	4	30	25	34	16	14	6	14
Port Chester, vil. (Westchester Co.)	2	8	2	9	17	10	9	15	27	1	18
Rye, town (Westchester Co.)	....	....	3	....	4	5	4	7	3	1	2
Tarrytown, village (Westchester Co.)		8	1	3	6	10	5	6	3	....	3
White Plains, village (West. Co.)	3	15	1	13	18	25	22	19	18	3	12
Yonkers (Westchester Co.)	22	59	6	21	78	175	75	85	180	9	52
Rest of county	16	71	8	22	98	90	65	43	33	16	25
Totals for the District	1,483	4,093	826	2,663	3,682	11,246	6,002	7,585	6,194	810	3,717
HUDSON VALLEY DISTRICT:											
Albany (Albany Co.)	10	135	25	67	191	279	126	97	56	31	107
Cohoes (Albany Co.)	7	14	....	11	60	35	34	45	54	9	18
Green Island, village (Albany Co.)	....	5	....	1	6	15	4	4	2	....	1
Watervliet (Albany Co.)	8	8	2	6	34	26	23	22	11	5	16
Rest of county	8	29	3	7	50	72	23	27	19	3	26
Hudson (Columbia Co.)	5	9	1	8	27	28	10	17	17	5	10
Rest of county	6	32	6	17	63	59	35	23	15	9	25
Fishkill, town (Dutchess Co.)	....	2	....	3	6	8	4	4	8	1	3
Fishkill Landing, village (Dutch. Co.)		3		2	11	4	10	7	1	....	4
Matteawan, village (Dutchess Co.)	....	6	1	4	17	13	11	7	5	2	5
Poughkeepsie, (Dutchess Co.)	6	27	6	15	58	67	31	23	21	6	20
Wappingers Falls, village (Dutch. Co.)	2	5	....	2	5	6	2	3	2	....	1
Rest of county	7	37	12	26	99	125	51	35	23	6	35
Catskill, village (Greene Co.)	2	5		2	18	6	5	4	1	....	9
Coxsackie, town (Greene Co.)	1	4	1	4	12	7	1	6	4	3	3
Rest of county	8	22	3	10	53	40	12	17	8	3	22
Goshen, town (Orange Co.)	3	9	1	9	17	13	8	8	2	4	4
Middletown (Orange Co.)	8	16	4	13	37	34	18	16	1	....	17
Montgomery, town (Orange Co.)	....	5	....	4	8	7	1	2	2	....	3
Newburgh (Orange Co.)	2	25	3	16	59	51	50	26	25	8	28
Port Jervis (Orange Co.)	1	10	1	12	24	12	10	4	5	2	11

the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Brights disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS Total births	Still births
MARITIME DISTRICT:											
City of New York:											
BOROUGH OF MANHATTAN	2,353	664	386	2,148	2,147	400	180	761	759	66,358	3,526
BOROUGH OF THE BRONX	356	95	59	175	272	64	10	156	148	10,905	549
BOROUGH OF BROOKLYN	1,793	600	271	902	1,091	226	76	296	604	42,708	2,206
BOROUGH OF QUEENS	279	51	31	223	242	40	16	125	48	7,119	348
BOROUGH OF RICHMOND	112	22	17	69	81	16	2	68	33	1,991	93
Totals	4,893	1,432	764	3,517	3,833	746	284	1,406	1,583	129,081	6,722
Freeport, village (Nassau Co.)	3	1	....	..	2	1	....	1	1	76	6
Hempstead, town (Nassau Co.)	41	6	6	15	37	7	3	8	35	717	31
North Hempstead, town (Nassau Co.)	10	6	8	6	38	1	3	5	15	473	6
Oyster Bay, town (Nassau Co.)	25	5	1	9	21	4	1	7	12	378	15
Rockville Center, village (Nassau Co.)	2	4	....	....	2	1	....	1	2	61	2
Amityville, village (Suffolk Co.)	12	1	....	....	....	1	....	2	2	39	2
Babylon, village (Suffolk Co.)	2	....	....	1	3	....	....	1	4	60	0
Brookhaven, town (Suffolk Co.)	23	3	2	....	13	....	....	8	6	174	1
Greenport, village (Suffolk Co.)	....	....	....	....	2	2	....	1	7	97	2
Huntington, town (Suffolk Co.)	14	1	3	2	9	1	....	1	18	234	16
Patchogue, village (Suffolk Co.)	4	....	....	1	2	....	....	1	1	64	1
Sag Harbor, village (Suffolk Co.)	5	1	....	....	3	....	....	....	3	49	3
Southold, town (Suffolk Co.)	6	....	1	....	8	1	....	2	1	103	0
Rest of county	69	13	3	8	33	11	....	10	34	....	....
Dobbs Ferry, village (West. Co.)	7	3	....	....	12	2	....	2	5	80	2
Greenburgh, town (Westchester Co.)	3	1	2	3	4	....	....	1	9	63	5
Hastings-on-Hudson, vil. (West. Co.)	2	1	....	1	3	....	....	2	2	97	6
Irvington, village (Westchester Co.)	....	1	....	....	6	....	....	....	2	36	2
Mamaroneck, town (Westchester Co.)	8	2	....	....	9	1	1	....	3	145	6
Mount Vernon (Westchester Co.)	42	7	3	7	19	3	....	2	23	706	28
New Rochelle (Westchester Co.)	33	8	5	7	26	4	4	1	23	753	35
North Tarrytown, village (West. Co.)	6	1	1	3	3	2	....	3	5	148	6
Ossining, village (Westchester Co.)	18	4	2	2	6	7	....	1	14	171	6
Peekskill, village (Westchester Co.)	21	7	5	8	13	....	1	2	11	330	13
Port Chester, village (West. Co.)	14	7	4	5	10	3	2	10	7	440	26
Rye, town (Westchester Co.)	4	4	1	....	5	1	1	....	1	61	4
Tarrytown, village (Westchester Co.)	7	1	1	1	11	....	1	2	3	90	8
White Plains, village (West. Co.)	28	6	4	6	34	3	1	3	18	350	26
Yonkers, (Westchester Co.)	65	41	16	....	46	9	1	12	76	2,064	100
Rest of county	62	11	7	12	58	7	5	18	33	....	....
Totals for the District	429	1,578	839	3,614	4,271	818	308	1,513	1,959	....	....
HUDSON VALLEY DISTRICT:											
Albany (Albany Co.)	139	72	15	70	79	14	3	38	43	1,369	76
Cohoes (Albany Co.)	23	8	4	10	14	7	....	7	24	435	26
Green Island, village (Albany Co.)	3	2	2	3	4	....	1	2	...	75	4
Watervliet (Albany Co.)	17	7	1	2	11	....	....	5	16	210	8
Rest of county	38	8	4	9	33	9	1	12	15	....	....
Hudson (Columbia Co.)	21	2	2	1	21	....	2	3	11	254	10
Rest of county	57	11	1	12	46	4	4	21	23	....	....
Fishkill, town (Dutchess Co.)	1	1	1	....	7	....	....	....	3	84	2
Fishkill Landing, village (Dutch. Co.)	6	....	....	....	5	....	....	1	4	94	2
Matteawan, village (Dutchess Co.)	9	7	3	2	9	....	....	2	5	105	3
Poughkeepsie (Dutchess Co.)	39	10	5	6	31	3	....	6	28	570	25
Wappingers Falls, village (Dutch. Co.	3	2	1	....	1	....	....	1	3	46	0
Rest of county	43	17	2	10	43	4	2	10	36	....	....
Catskill, village (Greene Co.)	7	1	2	1	5	....	....	6	4	91	3
Coxsackie, town (Greene Co.)	4	2	....	....	4	1	....	1	6	95	4
Rest of county	30	16	1	7	15	1	....	3	17	....	....
Goshen, town (Orange Co.)	3	7	....	1	5	3	....	6	3	67	5
Middletown, (Orange Co.)	23	6	1	4	24	6	1	3	5	266	9
Montgomery, town (Orange Co.)	3	....	1	....	4	1	....	1	4	53	3
Newburgh (Orange Co.)	48	10	5	5	27	6	3	3	22	536	20
Port Jervis (Orange Co.)	7	4	4	5	16	3	....	5	9	166	7

Total Mortality for the Year 1910 *in*

SANITARY DISTRICTS	Population U. S. census July 1, 1910	Total deaths	Ages: Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
HUDSON VALLEY DISTRICT—(*Cont'd*)								
Walden, village (Orange Co.)	4,015	49	8	0	2	5	13	21
Warwick, town (Orange Co.)	7,161	121	23	14	8	9	23	44
Rest of county	44,048	727	140	53	35	95	111	289
Cold Spring, village (Putnam Co.)	2,557	50	9	3	2	6	9	20
Rest of county	12,132	217	22	7	12	20	49	98
Hoosick Falls, village (Rensselaer Co.)	5,544	87	12	5	8	14	19	29
Rensselaer (Rensselaer Co.)	10,712	158	32	5	10	22	30	59
Troy (Rensselaer Co.)	76,836	1,597	224	103	82	262	374	550
Rest of county	29,203	441	43	17	17	47	72	244
Haverstraw, town (Rockland Co.)	9,288	97	18	5	7	17	21	27
Nyack, village (Rockland Co.)	4,626	97	16	3	4	19	18	37
Ramapo, town (Rockland Co.)	6,588	122	23	8	5	13	23	50
Spring Valley, village (Rockland Co.)	2,344	21	4	2	2	3	5	5
Suffern, village (Rockland Co.)	2,663	47	7	1	3	10	7	19
Rest of county	21,448	284	58	16	14	41	51	102
Ellenville, village (Ulster Co.)	3,124	47	5	3	2	6	5	26
Esopus, town (Ulster Co.)	4,731	58	5	5	1	10	12	25
Kingston (Ulster Co.)	25,929	475	71	25	26	66	93	194
Marbletown, town (Ulster Co.)	4,787	57	7	3	6	11	8	22
Rosendale, town (Ulster Co.)	3,678	56	2	2	6	10	7	29
Saugerties, village (Ulster Co.)	3,933	63	9	7	2	7	14	24
Rest of county	45,807	703	87	35	41	98	124	314
Totals for the District	727,719	12,703	1,867	705	677	1,774	2,551	5,087
ADIRONDACK AND NORTHERN DISTRICT:								
Plattsburg, (Clinton Co.)	11,182	195	53	14	14	26	28	60
Rest of county	37,039	481	93	48	30	51	52	207
Essex county	33,501	543	88	34	39	84	89	208
Malone, village (Franklin Co.)	6,467	108	22	6	3	20	17	40
Saranac Lake, village (Franklin Co.)	5,032	150	13	8	8	67	40	14
Tupper Lake, village (Franklin Co.)	3,079	50	21	7	3	10	4	4
Rest of county	31,090	514	102	56	38	75	69	174
Hamilton county	4,350	56	9	4	4	16	8	15
Carthage, village (Jefferson Co.)	3,569	57	12	5	2	9	7	22
Clayton, town (Jefferson Co.)	4,026	59	4	0	1	7	14	33
Ellisburg, town (Jefferson Co.)	3,631	73	11	2	2	7	12	39
Watertown (Jefferson Co.)	26,792	468	87	27	26	85	80	163
Rest of county	42,374	695	86	34	33	52	104	385
Lowville, town (Lewis Co.)	3,872	68	7	2	2	10	8	30
Rest of county	20,905	306	36	11	14	36	42	166
Canton, town (St. Lawrence Co.)	6,123	104	9	2	4	10	17	62
Gouverneur, town (St. Lawrence Co.)	5,998	95	21	4	7	14	16	33
Massena, village (St. Lawrence Co.)	2,968	50	11	7	2	4	7	18
Ogdensburg (St. Lawrence Co.)	15,981	268	55	15	12	33	54	98
Potsdam, village (St. Lawrence Co.)	4,031	78	8	9	2	9	6	43
Rest of county	53,802	756	107	42	46	83	97	375
Glens Falls (Warren Co.)	15,268	241	32	8	12	35	48	106
Rest of county	16,973	215	16	2	9	24	44	120
Fort Edward, town (Washington Co.)	5,759	100	13	3	5	16	22	40
Granville, town (Washington Co.)	6,433	87	18	5	6	2	11	45
Greenwich, town (Washington Co.)	4,224	89	10	4	3	4	18	50
Sandy Hill, village (Washington Co.)	5,184	74	10	1	4	10	14	35
Whitehall, village (Washington Co.)	4,949	96	21	1	7	14	15	38
Rest of county	21,253	350	36	10	10	36	46	210
Totals for the District	405,855	6,426	1,011	371	348	849	989	2,842
MOHAWK VALLEY DISTRICT:								
Johnstown (Fulton Co.)	10,476	143	20	4	4	12	32	71
Gloversville (Fulton Co.)	20,730	321	60	14	12	31	71	132
Rest of county	13,430	209	28	4	8	21	33	115

the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cereorospinal Meningitis	Pulmonary tuberculosis
HUDSON VALLEY DIST.—(*Cont'd*)											
Walden, village (Orange Co.)	2	1	1					2			5
Warwick, town (Orange Co.)				4	1	4	1	2			9
Rest of county	1			4	7	4	14	15	2	1	53
Cold Spring, village (Putnam Co.)		1									4
Rest of county		1		3	1		1	6			14
Hoosick Falls, village (Rensselaer Co.)					1		1		1	1	11
Rensselaer (Rensselaer Co.)	3	1		1	1	7	1	3			15
Troy (Rensselaer Co.)	15			15	17	4	13	24		9	175
Rest of county	8				3	1	3	15	1	1	28
Haverstraw, town (Rockland Co.)		4									13
Nyack, village (Rockland Co.)					2	2		2			5
Ramapo, town (Rockland Co.)	1			1		1	1		1	1	16
Spring Valley, village (Rockland Co.)										2	2
Suffern, village (Rockland Co.)											5
Rest of county	4	1		3	1	1	3	5	3		24
Ellenville, village (Ulster Co.)	2							2			4
Esopus, town (Ulster Co.)							3			1	7
Kingston (Ulster Co.)	5			2	2	5	7	14	4	3	46
Marbletown, town (Ulster Co.)				1				1			1
Rosendale, town (Ulster Co.)	1					1		1		1	5
Saugerties, village (Ulster Co.)	2							2			10
Rest of county	7	3		2	1	4	15	16	2	6	57
Totals for the District	155	15	1	84	101	65	122	203	27	40	1,205
ADIRONDACK AND NORTHERN DISTRICT											
Plattsburg, (Clinton Co.)	3			4	2	8		2		1	23
Rest of county	4			4	9	8	6	16	3	2	38
Essex county	6			4		5	12	18	1	3	57
Malone, village (Franklin Co.)	2			2		1		6			16
Saranac Lake, village (Franklin Co.)				2		3	1				99
Tupper Lake, village (Franklin Co.)				2		1	2	1			10
Rest of county	8			12		12	8	12		1	52
Hamilton county	3				1			1			6
Carthage, village (Jefferson Co.)	2							1			3
Clayton, town (Jefferson Co.)	2	1						3			5
Ellisburg, town (Jefferson Co.)								4			2
Watertown (Jefferson Co.)	24			15			3	4	3	1	21
Rest of county	11			12	1		2	12	1	1	36
Lowville, town (Lewis Co.)	1								1		5
Rest of county	1						1	14	2		23
Canton, town (St. Lawrence Co.)	1					1		4	1		4
Gouverneur, town (St. Lawrence Co.)	1			3			1	4		2	6
Massena, village (St. Lawrence Co.)				5			1				
Ogdensburg (St. Lawrence Co.)	6				1		4	1	1	2	17
Potsdam, village (St. Lawrence Co.)	1			1				1			6
Rest of county	11			8	1	5	3	28	1	5	36
Glens Falls (Warren Co.)	2	2			1	1		4		1	18
Rest of county	4						1	5	1		17
Fort Edward, town (Washington Co.)						1		3			2
Granville, town (Washington Co.)	1							4			9
Greenwich, town (Washington Co.)						1		5			3
Sandy Hill, village (Washington Co.)								4			4
Whitehall, village (Washington Co.)	1							1	1		8
Rest of county	4			1	2	4	1	8			26
Totals for the District	99	3		75	18	51	46	166	16	19	552
MOHAWK VALLEY DISTRICT:											
Johnstown (Fulton Co.)	1							3			11
Gloversville (Fulton Co.)	2			4	1		3	6		2	16
Rest of county	1					1		5	1		13

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and Enteritis: Under 2 years	Diarrhea and Enteritis: Over 2 years	Other diseases of the digestive system
HUDSON VALLEY DIST.—(*Cont'd*)											
Walden, village (Orange Co.)	....	2	1	2	3	8	1	1	3	2	1
Warwick, town (Orange Co.)	3	6	....	6	14	9	7	6	6	....	7
Rest of county	12	26	15	20	82	78	53	47	40	11	39
Cold Spring, village (Putnam Co.)	1	3	1	....	2	3	4	6	3	....	3
Rest of county	1	15	3	5	25	27	15	5	8	3	15
Hoosick Falls, village (Rens. Co.)	2	5	....	2	14	9	8	6	3	3	2
Rensselaer (Rensselaer Co.)	....	14	....	5	15	20	9	11	2	3	6
Troy (Rensselaer Co.)	26	83	19	53	133	222	115	109	67	28	110
Rest of county	6	23	5	12	58	67	26	26	10	6	16
Haverstraw, town (Rockland Co.)	....	3	1	3	8	7	10	3	6	....	5
Nyack, village (Rockland Co.)	....	9	1	2	8	19	6	5	2	3	6
Ramapo, town (Rockland Co.)	2	6	1	7	21	8	4	12	9	2	3
Spring Valley, village (Rockland Co.)	....	....	....	....	4	1	....	1	1	....	1
Suffern, village (Rockland Co.)	....	2	2	2	7	4	1	1	3	....	5
Rest of county	2	14	3	5	34	31	14	16	17	3	14
Ellenville, village (Ulster Co.)	1	1	....	1	8	7	4	1	1	....	2
Esopus, town (Ulster Co.)	1	2	1	....	5	6	6	2	....	....	4
Kingston, (Ulster Co.)	8	21	5	11	61	71	26	17	12	3	34
Marbletown, town (Ulster Co.)	....	3	....	1	7	5	7	4	3	....	4
Rosendale, town (Ulster Co.)	....	1	....	2	5	8	6	6	1	....	1
Saugerties, village (Ulster Co.)	....	3	....	2	8	1	7	4	3	1	4
Rest of county	6	39	7	20	89	79	55	34	19	10	35
Totals for the District	155	689	134	400	1,466	1,606	853	720	501	175	685
ADIRONDACK AND NORTHERN DISTRICT:											
Plattsburg (Clinton Co.)	6	9	2	4	20	19	11	11	7	1	10
Rest of county	6	17	....	24	55	57	38	33	28	8	28
Essex county	2	24	6	18	44	72	37	29	25	12	30
Malone, village (Franklin Co.)	....	4	....	4	11	7	10	6	5	3	1
Saranac Lake, village (Franklin Co.)	9	4	....	....	4	6	4	1	2	....	1
Tupper Lake, village (Franklin Co.)	....	1	2	....	5	2	2	2	4	....	2
Rest of county	10	24	2	18	55	46	38	23	29	10	27
Hamilton county	1	2	1	4	4	3	....	2	3	1	5
Carthage, village (Jefferson Co.)	....	1	....	1	5	4	3	3	4	2	6
Clayton, town (Jefferson Co.)	1	4	....	3	4	14	4	4	....	....	3
Ellisburg, town (Jefferson Co.)	2	2	....	5	13	9	7	1	....	....	7
Watertown (Jefferson Co.)	3	23	2	22	49	54	29	24	20	6	34
Rest of county	6	46	6	27	89	112	38	40	19	15	43
Lowville, town (Lewis Co.)	1	5	1	6	7	9	2	2	3	....	4
Rest of county	2	21	7	17	54	27	20	9	8	9	17
Canton, town (St. Lawrence Co.)	3	4	....	6	14	25	2	6	3	3	10
Gouverneur, town (St. Lawrence Co.)	1	5	3	7	11	14	4	2	6	3	....
Massena, village (St. Lawrence Co.)	....	....	4	3	7	4	9	....	1	....	5
Ogdensburg (St. Lawrence Co.)	6	14	3	11	24	34	8	25	16	2	13
Potsdam, village (St. Lawrence Co.)	....	4	....	4	13	9	7	1	3	....	4
Rest of county	6	39	8	29	99	100	61	40	34	5	35
Glens Falls (Warren Co.)	6	12	5	6	30	41	16	14	7	3	23
Rest of county	1	13	2	8	29	30	13	10	....	8	11
Fort Edward, town (Washington Co.)	1	3	....	1	11	13	8	7	2	2	10
Granville, town (Washington Co.)	....	5	3	3	5	8	3	5	6	....	7
Greenwich, town (Washington Co.)	2	6	....	3	13	10	4	4	1	....	7
Sandy Hill, village (Washington Co.)	2	4	....	4	11	15	8	5	5	1	2
Whitehall, village (Washington Co.)	....	3	....	4	10	5	2	11	9	1	7
Rest of county	5	15	3	8	61	54	23	21	8	3	18
Totals for the District	82	314	60	250	757	803	411	341	258	98	370
MOHAWK VALLEY DISTRICT:											
Johnstown (Fulton Co.)	....	13	....	2	22	12	18	6	7	1	16
Gloversville (Fulton Co.)	3	15	2	11	43	30	16	19	14	1	31
Rest of county	3	14	4	10	24	22	16	7	5	2	15

the State During 1910 — (Continued)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
HUDSON VALLEY DIST.—(*Cont'd*)											
Walden, village (Orange Co.)	5	3	....	...	1	....	....	2	3	70	3
Warwick, town (Orange Co.)	6	2	1	6	14	1	....	2	4	136	7
Rest of county	51	16	4	16	60	8	2	7	39	....	....
Cold Spring, village (Putnam Co.)	2	4	....	....	7	1	....	2	3	64	2
Rest of county	15	6	....	2	33	2	....	3	8	....	....
Hoosick Falls, village (Rensselaer Co.)	4	2	1	3	5	1	....	....	2	129	5
Rensselaer (Rensselaer Co.)	6	....	1	6	15	....	....	4	9	167	3
Troy (Rensselaer Co.)	113	39	9	29	71	7	1	36	55	956	61
Rest of county	35	17	3	8	34	4	2	5	18	....	....
Haverstraw, town (Rockland Co.)	6	1	2	4	14	2	2	....	3	139	4
Nyack, village (Rockland Co.)	5	3	3	5	3	1	2	1	2	97	4
Ramapo, town	9	....	....	3	5	3	....	2	3	112	8
Spring Valley, village (Rockland Co.)	4	1	1	1	....	1	....	....	1	64	0
Suffern, village (Rockland Co.)	3	....	2	....	6	2	....	....	2	45	1
Rest of county	29	5	3	7	15	6	1	6	14	....	....
Ellenville, village (Ulster Co.)	2	4	1	1	1	1	....	1	2	36	0
Esopus, town (Ulster Co.)	10	2	....	1	4	....	1	....	2	82	3
Kingston (Ulster Co.)	24	9	4	11	29	2	2	11	26	431	20
Marbletown, town (Ulster Co.)	4	2	....	1	11	....	....	1	1	74	2
Rosendale, town (Ulster Co.)	7	1	....	....	3	2	....	4	....	57	3
Saugerties, village (Ulster Co.)	5	1	....	2	3	1	....	2	2	65	3
Rest of county	45	18	4	14	60	6	1	28	21	....	....
Totals for the District	914	329	94	268	798	113	31	253	501	....	....
ADIRONDACK AND NORTHERN DISTRICT:											
Plattsburg (Clinton Co.)	2	5	4	14	4	2	1	7	13	284	12
Rest of county	13	7	6	10	19	....	1	20	21	....	....
Essex county	29	9	7	7	37	2	1	18	28	....	....
Malone, village (Franklin Co.)	7	3	....	2	3	3	....	4	8	145	8
Saranac Lake, village (Franklin Co.)	3	3	1	....	1	2	....	1	3	106	7
Tupper Lake, village (Franklin Co.)	....	....	1	3	1	....	....	1	8	80	3
Rest of county	24	8	6	12	22	3	....	23	29	....	....
Hamilton county	4	1	2	....	6	....	....	2	4	....	....
Carthage, village (Jefferson Co.)	4	1	1	3	4	1	....	5	3	92	4
Clayton, town (Jefferson Co.)	1	2	1	....	2	....	....	1	4	75	1
Ellisburg, town (Jefferson Co.)	7	1	....	....	3	2	....	....	8	76	4
Watertown (Jefferson Co.)	24	15	10	5	30	6	1	6	34	620	22
Rest of county	44	16	3	11	23	9	2	37	33	....	....
Lowville, town (Lewis Co.)	10	2	1	1	2	1	....	2	2	54	0
Rest of county	23	1	5	3	15	1	....	11	15	....	....
Canton, town (St. Lawrence Co.)	5	....	....	1	4	3	....	3	1	109	6
Gouverneur, town (St. Lawrence Co.)	2	....	3	....	4	....	....	3	10	105	1
Massena, village (St. Lawrence Co.)	1	1	....	4	2	1	....	1	1	72	0
Ogdensburg (St. Lawrence Co.)	19	8	2	6	10	2	....	16	17	348	16
Potsdam, village (St. Lawrence Co.)	1	2	2	1	3	....	....	13	2	75	1
Rest of county	43	17	7	12	44	8	2	30	39	....	....
Glens Falls (Warren Co.)	12	5	1	2	6	4	....	3	16	290	5
Rest of county	26	6	2	2	11	3	....	5	7	....	....
Fort Edward, town (Washington Co.)	9	2	4	3	13	....	....	1	4	106	2
Granville, town (Washington Co.)	15	1	....	3	4	1	....	....	4	127	4
Greenwich, town (Washington Co.)	9	2	1	1	7	2	....	3	5	73	5
Sandy Hill, village (Washington Co.)	2	1	....	....	2	1	....	3	....	97	1
Whitehall, village (Washington Co.)	9	6	2	2	9	1	....	....	4	130	9
Rest of county	30	8	1	3	15	3	....	13	12	....	....
Totals for the District	378	133	73	111	306	61	8	232	335	....	....
MOHAWK VALLEY DISTRICT:											
Johnstown (Fulton Co.)	10	1	2	3	2	3	....	5	5	177	6
Gloversville (Fulton Co.)	30	17	3	6	14	3	....	8	21	401	14
Rest of county	19	8	1	3	9	4	2	8	12	....	....

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Population U. S. census July 1, 1910	Total deaths	AGES					
			Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
MOHAWK VALLEY DISTRICT—(*Cont'd*)								
Frankfort, village (Herkimer Co.)	3,321	56	19	5	3	4	12	13
Herkimer, village (Herkimer Co.)	7,559	121	22	7	12	16	27	36
Ilion, village (Herkimer Co.)	6,616	90	12	1	5	16	11	45
Little Falls (Herkimer Co.)	12,326	194	29	11	18	23	41	71
Rest of county	26,650	406	45	18	12	47	67	217
Amsterdam (Montgomery Co.)	31,586	540	160	61	30	71	95	122
Fort Plains, village (Montgomery Co.)	2,769	61	10	0	1	11	10	29
Rest of county	23,547	390	44	12	14	46	77	192
Boonville, town (Oneida Co.)	3,193	57	7	2	4	5	8	31
Camden, town (Oneida Co.)	3,413	52	4	2	2	8	7	29
Rome (Oneida Co.)	20,632	411	71	21	14	49	79	177
Utica (Oneida Co.)	74,879	1,297	314	102	64	166	221	426
Whitestown, town (Oneida Co.)	7,838	107	28	12	1	18	12	36
Rest of county	44,786	638	69	21	25	65	94	364
Ballston Spa, village (Saratoga Co.)	4,138	74	15	1	3	6	16	33
Mechanicville, village (Saratoga Co.)	6,666	117	24	15	5	14	28	31
Saratoga Springs, village (Saratoga Co.)	12,680	255	35	16	9	42	59	94
Waterford, town (Saratoga Co.)	6,134	109	23	12	4	15	17	38
Rest of county	32,282	526	57	18	22	61	74	292
Schenectady (Schenectady Co.)	73,450	1,070	289	111	52	177	198	243
Rest of county	15,516	179	31	12	9	31	30	65
Cobleskill, town (Schoharie Co.)	3,574	57	4	2	4	7	12	28
Rest of county	20,223	338	32	16	12	27	47	201
Totals for the District	488,414	7,818	1,452	500	350	989	1,378	3,131
SOUTHERN TIER DISTRICT:								
Wellsville, village (Allegany Co.)	4,383	65	10	2	2	4	11	36
Rest of county	36,958	557	52	16	20	55	75	336
Binghamton (Broome Co.)	48,671	765	138	37	41	128	158	263
Lestershire, village (Broome Co.)	3,764	63	6	4	4	14	9	26
Rest of county	26,608	503	46	19	16	49	90	282
Olean (Cattaraugus Co.)	14,814	188	28	11	19	32	41	57
Salamanca, village (Cattaraugus Co.)	5,806	85	18	10	3	9	20	25
Rest of county	45,299	628	67	36	32	51	88	353
Dunkirk (Chautauqua Co.)	17,308	279	76	37	28	38	39	61
Fredonia, village (Chautauqua Co.)	5,290	79	15	4	2	8	9	41
Jamestown (Chautauqua Co.)	31,523	404	66	21	23	71	80	143
Westfield, village (Chautauqua Co.)	2,991	64	9	4	3	5	12	31
Rest of county	48,380	718	89	22	27	57	103	419
Elmira (Chemung Co.)	37,238	554	74	20	30	78	114	236
Horseheads, town (Chemung Co.)	5,398	76	3	2	1	8	13	49
Rest of county	12,115	236	36	10	6	31	41	110
Bath, village (Steuben Co.)	3,891	67	6	1	2	7	9	42
Corning (Steuben Co.)	13,742	200	30	8	12	34	41	75
Hornell (Steuben Co.)	13,637	174	20	7	14	21	40	72
Rest of county	52,112	780	76	21	30	59	122	466
Candor, town (Tioga Co.)	2,902	43	1	0	2	3	8	29
Owego, village (Tioga Co.)	4,617	54	4	0	0	3	16	31
Waverly, village (Tioga Co.)	4,853	83	7	3	8	11	10	44
Rest of county	13,204	224	19	8	6	13	41	136
Totals for the District	455,504	6,889	896	303	331	789	1,190	3,363
EAST CENTRAL DISTRICT:								
Norwich, village (Chenango Co.)	7,434	122	10	10	4	19	28	51
Rest of county	28,089	476	38	19	12	25	78	304
Cortland (Cortland Co.)	11,517	219	36	11	5	20	39	108
Homer, village (Cortland Co.)	2,701	49	2	1	1	5	9	31
Rest of county	15,026	260	21	12	9	11	37	169
Sidney, town (Delaware Co.)	4,142	72	4	1	3	10	17	37
Walton, town (Delaware Co.)	5,094	88	8	3	5	11	17	44

the State During 1910 — (Continued)

SANITARY DISTRICTS	Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal Meningitis	Pulmonary tuberculosis
	EPIDEMIC DISEASES										
MOHAWK VALLEY DIST.—(*Cont'd*)											
Frankfort, village (Herkimer Co.)				1			1	1			3
Herkimer, village (Herkimer Co.)				2		1	1				5
Ilion, village (Herkimer Co.)	1				1	1				1	4
Little Falls (Herkimer Co.)	1				3	2		3			10
Rest of county						3	[illegible]	11			34
Amsterdam (Montgomery Co.)	7			1	4	8	12	2	1	1	32
Fort Plain, village (Montgomery Co.)	2										3
Rest of county	2			1	1	3	3	6	5		25
Boonville, town (Oneida Co.)											3
Camden, town (Oneida Co.)				1				1			8
Rome (Oneida Co.)	4			3		2	10	7	1		26
Utica (Oneida Co.)	5			11		14	14	18	2	5	94
Whitestown, town (Oneida Co.)	2					1		3			9
Rest of county	5	1			1	3	6	6	2	1	52
Ballston Spa, village (Saratoga Co.)	2					2		3			5
Mechanicville, village (Saratoga Co.)	2			7			1	1	1	3	6
Saratoga Springs, vil. (Saratoga Co.)	2			4	2	1	2	5			22
Waterford, town (Saratoga Co.)	2				4		3	1			13
Rest of county	5			1	8	1	1	16	2	1	28
Schenectady (Schenectady Co.)	5			11	3	10	15	4	2	3	72
Rest of county				3		1	3	2		1	11
Cobleskill, town (Schoharie Co.)	1				1	1					4
Rest of county	1	1		6	1	5	2	10			18
Totals for the District	53	2		56	30	60	80	114	17	18	527
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany Co.)											2
Rest of county	7			4	2		1	17	2	1	15
Binghamton (Broome Co.)	6			4	3	5	11	5	4	1	58
Lestershire, village (Braome Co.)					1			1			4
Rest of county	5				7	1	2	10		1	31
Olean (Cattaraugus Co.)				2			5			1	7
Salamanca, village (Cattaraugus Co.)	1				2		1	2			3
Rest of county	6	1		6	3	1	3	16	4	2	30
Dunkirk (Chautauqua Co.)	4			4	25		9	2			11
Fredonia, village (Chautauqua Co.)	1			2	1			2			7
Jamestown (Chautauqua Co.)	9			1	4	1	5	4		1	23
Westfield, village (Chautauqua Co.)				3	1		3				2
Rest of county	1			2	3	6	5	28	5	3	23
Elmira (Chemung Co.)	10	2			1	5	8	11		1	19
Horseheads, town (Chemung Co.)							1	1			10
Rest of county	4					1		9	1	1	25
Bath, village (Steuben Co.)	1										6
Corning (Steuben Co.)	8				1	1		1			7
Hornell (Steuben Co.)	5			3	1			5		1	5
Rest of county	4				4	5	1	16		2	27
Candor, town (Tioga Co.)										1	
Owego, village (Tioga Co.)											4
Waverly, village (Tioga Co.)								4			5
Rest of county	2				1			5			7
Totals for the District	74	3		31	60	26	55	139	16	16	331
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango Co.)		1					3	4		2	6
Rest of county	3			3		1	1	20	1	2	19
Cortland (Cortland Co.)	9						2	2		1	3
Homer, village (Cortland Co.)	1			1			1	2		1	1
Rest of county	2			1	2			5			9
Sidney, town (Delaware Co.)	3						1	1			5
Walton, town (Delaware Co.)	1				1			5			3

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and Enteritis: Under 2 years	Diarrhea and Enteritis: Over 2 years	Other diseases of the digestive system
MOHAWK VALLEY DIST.—*(Cont'd)*											
Frankfort, village (Herkimer Co.)...	1	1	2	1	4	10	5	7	7	....	1
Herkimer, village (Herkimer Co.)...	...	7	4	3	8	15	12	16	3	1	7
Ilion, village (Herkimer Co.).......	4	3	2	1	14	5	9	5	1	....	9
Little Falls (Herkimer Co.)........	2	5	6	4	14	31	19	10	11	1	11
Rest of county..................	4	24	9	13	60	60	19	16	12	8	23
Amsterdam (Montgomery Co.) ...	6	15	7	12	44	39	54	32	89	11	30
Fort Plains, village (Montgomery Co.	1	3	2	2	4	8	1	4	2	2	6
Rest of county...................	5	20	6	17	53	41	36	21	9	3	20
Boonville, town (Oneida Co.)...	1	6	1	3	10	11	6	3	1	....	1
Camden, town (Oneida Co.)......		2	1	1	7	7	1	2	3	1	2
Rome (Oneida Co.)..............	11	27	2	17	55	58	19	18	27	4	28
Utica (Oneida Co.)	30	65	11	52	126	142	101	79	100	10	88
Whitestown, town (Oneida Co.)....	2	6	....	2	14	10	11	7	15	....	5
Rest of county	7	45	13	19	74	86	52	35	16	6	47
Ballston Spa, village (Saratoga Co.).	...	4	....	2	12	8	3	5	8	2	3
Mechanicville, village (Saratoga Co.)	2	4	...	1	8	13	4	15	7	1	5
Saratoga Springs, vil. (Saratoga Co.).	2	22	3	8	21	25	19	19	10	....	19
Waterford, town (Saratoga Co.)....	....	3	1	3	13	9	8	7	5	2	4
Rest of county..................	6	32	5	22	75	64	40	30	19	3	23
Schenectady (Schenectady Co.).....	14	41	10	50	90	84	106	74	115	12	59
Rest of county..........	4	11	1	6	20	17	13	6	15	2	4
Cobleskill, town (Schoharie Co.)....	1	5	....	6	6	8	5	3	....	....	3
Rest of county..................	1	20	3	9	66	44	23	17	3	2	17
Totals for the District.........	108	411	95	277	887	859	618	463	504	75	477
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany Co.)....	....	4	2	3	5	7	4	6	3	2	4
Rest of county..................	1	30	8	25	75	89	27	31	9	10	35
Binghamton (Broome Co.)	4	41	8	35	77	81	62	39	39	17	55
Lestershire, village (Broome Co.)....	1	4	....	1	4	4	4	4	2	2	6
Rest of county...................	5	32	2	20	84	71	27	23	8	7	35
Olean (Cattaraugus Co.).	3	17	2	8	19	22	16	6	9	....	19
Salamanca, village (Cattaraugus Co.).	1	6	....	4	10	5	5	2	6	1	4
Rest of county..................	6	46	9	21	95	89	48	37	16	13	41
Dunkirk (Chautauqua Co.).........	6	13	1	6	29	18	25	9	23	2	21
Fredonia, village (Chautauqua Co.).	2	2	1	4	18	5	4	6	7	....	3
Jamestown (Chautauqua Co.)......	10	21	4	14	43	47	30	23	8	6	31
Westfield, village (Chautauqua Co.).	....	7	....	....	9	13	3	......	3	1	2
Rest of county..................	12	48	13	19	85	124	42	37	27	7	40
Elmira (Chemung Co.).........	7	38	6	18	62	63	33	30	14	4	29
Horseheads, town (Chemung Co.)...	....	5	....	4	13	5	9	3	1	3	2
Rest of county..........	2	11	6	10	26	31	13	10	6	1	10
Bath, village (Steuben Co.)	1	5	....	5	7	12	5	1	1	....	4
Corning (Steuben Co.)............	2	6	4	5	29	20	18	9	4	3	24
Hornell (Steuben Co.)............	2	9	1	8	26	26	14	3	4	1	10
Rest of county.	4	53	7	31	128	134	41	31	18	19	48
Candor, town (Tioga Co.).........	....	2	3	3	7	1	2	4	1	....	4
Owego, village (Tioga Co.).	....	3	1	2	7	9	3	3	2	2	5
Waverly, village (Tioga Co.)	1	4	...	2	15	10	4	6	3	....	5
Rest of county.........	4	11	5	9	37	32	11	10	7	6	16
Totals for the District	74	418	83	257	910	918	450	333	221	107	453
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango Co.)...	2	9	...	6	14	10	12	14	6	2	7
Rest of county.	2	25	6	23	65	72	21	24	10	14	43
Cortland (Cortland Co.)	...	14	2	8	26	25	21	10	4	1	11
Homer, village (Cortland Co.)	1	2	...	2	5	6	7	3	....	1	3
Rest of county.	2	16	1	7	38	33	20	16	3	2	15
Sidney, town (Delaware Co.)		4	.	2	10	5	4	2	2	....	11
Walton, town (Delaware Co.)		5	.	3	7	5	14	3	....	2	5

the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	Births: Total births	Births: Still births
MOHAWK VALLEY DIST.—(Cont'd)											
Frankfort, village (Herkimer Co.)	1	1	....	...	1	1	....	2	5	119	5
Herkimer, village (Herkimer Co.)	11	1	2	1	11	1	2	....	7	172	5
Ilion, village (Herkimer Co.)	7	1	2	[illegible]	8	...	....	4	5	115	1
Little Falls (Herkimer Co.)	13	7	2	[illegible]	15	...	1	[illegible]	12	335	10
Rest of county	44	9	2	[illegible]	19	...	....	10	15	....	....
Amsterdam (Montgomery Co.)	34	11	9	10	31	5	....	[illegible]	25	695	14
Fort Plain, village (Montgomery Co.)	5	3	1	1	4	2	....	2	3	38	0
Rest of county	28	5	3	7	36	7	....	22	8	....	....
Boonville, town (Oneida Co.)	1	....	....	1	2	1	....	2	4	52	1
Camden, town (Oneida Co.)	5	1	....	[illegible]	3	....	....	3	1	46	1
Rome (Oneida Co.)	35	8	....	11	19	6	1	3	13	571	15
Utica (Oneida Co.)	77	36	10	27	61	11	3	27	78	1,902	79
Whitestown, town (Oneida Co.)	7	1	....	1	3	1	....	1	6	152	11
Rest of county	51	10	4	7	34	7	2	15	31	....	....
Ballston Spa, village (Saratoga Co.)	6	....	1	[illegible]	4	....	....	1	1	85	1
Mechanicville, village (Saratoga Co.)	3	2	1	7	14	3	....	1	7	218	5
Saratoga Springs, vil. (Saratoga Co.)	9	4	3	9	10	....	1	5	8	221	10
Waterford, town (Saratoga Co.)	3	2	....	1	7	2	....	10	6	79	0
Rest of county	42	11	2	10	29	7	....	20	22	....	....
Schenectady (Schenectady Co.)	63	25	12	18	62	11	1	16	80	1,817	70
Rest of county	14	3	2	2	26	3	....	3	6	....	....
Cobleskill, town (Schoharie Co.)	5	3	1	1	1	....	....	1	1	44	1
Rest of county	34	7	....	2	17	5	1	12	11	....	....
Totals for the District	577	[illegible]	63	141	442	83	14	197	393	....	....
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany Co.)	8	1	1	2	3	2	....	2	4	100	2
Rest of county	49	10	9	9	29	7	2	28	25	....	....
Binghamton (Broome Co.)	65	12	12	15	39	13	2	17	35	908	44
Lestershire, village (Broome Co.)	6	4	3	....	2	2	....	2	6	49	0
Rest of county	35	16	3		28	6	....	16	22	....	....
Olean (Cattaraugus Co.)	8	5	3		12	5	1	4	11	328	12
Salamanca, village (Cattaraugus Co.)	3	1	....		13	3	....	3	7	139	10
Rest of county	37	14	8	4	24	5	....	19	24	....	....
Dunkirk (Chautauqua Co.)	4	7	1		26	2	1	2	19	566	20
Fredonia, village (Chautauqua Co.)	2	1	1		3	....	....	2	3	129	6
Jamestown (Chautauqua Co.)	43	9	8		20	2	....	6	28	659	18
Westfield, village (Chautauqua Co.)	3	4	....		2	....	....	5	1	47	1
Rest of county	51	13	4	1	42	5	1	36	25	....	....
Elmira (Chemung Co.)	89	17	4	4	36	8	1	4	30	594	39
Horseheads, town (Chemung Co.)	7	1	....	....	3	....	....	5	3	54	4
Rest of county	17	9	4	2	14	3	....	4	16	....	....
Bath, village (Steuben Co.)	6	2	1	1	1	....	....	3	5	57	1
Corning (Steuben Co.)	10	9	1	3	16	1	....	7	11	268	9
Hornell (Steuben Co.)	9	10	3	5	14	1	....	3	5	233	11
Rest of county	58	15	6	10	[illegible]	12	2	35	27	....	....
Candor, town (Tioga Co.)	4	3	....	....	1	1	....	6	....	46	2
Owego, village (Tioga Co.)	4	2	....	1	....	....	....	4	2	62	1
Waverly, village (Tioga Co.)	3	5	....	2	9	1	....	3	1	74	0
Rest of county	18	8	2	1	13	6	....	7	6	....	....
Totals for the District	539	178	74	[illegible]	392	85	10	217	316	....	....
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango Co.)	8	1	2	1	7	....	....	2	3	150	5
Rest of county	43	11	4	5	17	1	2	16	22	....	....
Cortland (Cortland Co.)	24	5	2	5	14	2	1	8	19	264	6
Homer, village (Cortland Co.)	3	3	....	....	2	....	....	4	....	39	1
Rest of county	32	13	1	3	12	4	....	5	10	....	....
Sidney, town (Delaware Co.)	8	2	2	....	4	2	...	2	2	68	1
Walton, town (Delaware Co.)	10	3	....	3	5	.	....	6	5	104	0

Total Mortality for the Year 1910 *in*

SANITARY DISTRICTS	Population U. S. census July 1, 1910	Total deaths	Ages: Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
EAST CENTRAL DISTRICT—(*Continued*)								
Rest of county	36,296	566	56	23	38	71	89	287
Canastota, village (Madison Co.)	3,247	62	11	4	4	5	11	27
Cazenovia, town (Madison Co.)	3,693	65	7	1	3	8	10	36
Hamilton, town (Madison Co.)	3,835	61	8	0	3	3	4	43
Oneida (Madison Co.)	8,316	118	20	6	3	8	24	57
Rest of county	20,190	313	29	5	15	25	47	191
Baldwinsville, village (Onondaga Co.)	3,104	52	4	1	1	7	11	28
DeWitt, town (Onondaga Co.)	4,181	48	7	2	1	3	13	22
East Syracuse, village (Onondaga Co.)	3,285	47	7	5	6	10	6	13
Solvay, village (Onondaga Co.)	5,179	77	28	11	10	9	9	10
Syracuse (Onondaga Co.)	138,087	2,124	448	114	128	291	450	693
Rest of county	47,407	709	72	13	29	72	121	401
Cooperstown, village (Otsego Co.)	2,485	58	3	0	0	7	11	37
Oneonta (Otsego Co.)	9,552	181	27	4	7	35	28	77
Worcester, town (Otsego Co.)	2,180	49	4	3	2	4	5	31
Rest of county	32,965	559	48	8	17	39	76	368
Liberty, town (Sullivan Co.)	5,399	200	10	4	7	81	50	47
Rest of county	28,374	471	51	23	42	83	76	194
Totals for the District	431,778	7,046	959	284	355	862	1,266	3,306
WEST CENTRAL DISTRICT:								
Auburn (Cayuga Co.)	34,760	522	101	22	22	73	97	207
Rest of county	32,378	477	45	11	22	48	81	270
Batavia, village (Genesee Co.)	11,673	206	32	6	9	33	39	87
Le Roy, village (Genesee Co.)	3,787	47	5	3	2	7	11	19
Rest of county	22,230	337	35	5	9	28	63	197
Dansville, village (Livingston Co.)	3,939	74	8	5	0	8	13	40
Mt. Morris, village (Livingston Co.)	2,789	58	12	14	2	9	9	12
Rest of county	31,340	409	47	17	25	45	49	225
Canandaigua, village (Ontario Co.)	7,212	157	20	3	6	19	25	84
Geneva (Ontario Co.)	12,458	175	18	6	12	19	35	83
Manchester, town (Ontario Co.)	4,893	116	12	2	2	9	20	70
Phelps, town (Ontario Co.)	4,733	54	5	0	2	4	4	39
Rest of county	22,984	279	32	5	9	19	33	181
Hector, town (Schuyler Co.)	3,500	59	6	3	0	4	7	39
Rest of county	10,461	156	11	5	5	9	29	96
Seneca Falls, village (Seneca Co.)	6,582	114	13	2	4	14	18	62
Waterloo, village (Seneca Co.)	3,923	52	0	1	1	5	9	36
Rest of county	16,447	246	19	6	7	23	37	153
Ithaca (Tompkins Co.)	14,815	244	24	8	16	34	49	113
Rest of county	18,818	304	25	6	3	17	45	207
Perry, village (Wyoming Co.)	4,415	58	11	2	1	4	6	34
Warsaw, town (Wyoming Co.)	4,302	51	3	1	2	5	7	33
Rest of county	23,190	359	40	11	16	27	49	216
Penn Yan, village (Yates Co.)	4,600	70	7	3	3	7	8	41
Rest of county	14,014	210	28	2	4	16	29	130
Totals for the District	320,243	4,834	559	149	184	486	772	2,674
LAKE ONTARIO AND WESTERN DISTRICT:								
Amherst, town (Erie Co.)	4,635	65	9	3	1	9	8	35
Buffalo (Erie Co.)	425,715	6,877	1,482	683	452	1,067	1,433	1,760
Depew, village (Erie Co.)	3,937	85	41	18	10	8	5	3
East Aurora, village (Erie Co.)	2,795	41	6	2	1	2	4	26
Lackawanna (Erie Co.)	*14,549	397	243	69	8	43	13	19
Lancaster, village (Erie Co.)	4,385	67	15	9	5	8	15	15
Tonawanda (Erie Co.)	8,308	106	20	1	4	17	20	44
West Seneca, town (Erie Co.)	19,335	63	12	4	5	6	12	24
Rest of county	47,679	845	141	50	46	99	122	386
Brockport, village (Monroe Co.)	3,577	50	6	0	1	5	5	33

* Excise census.

the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal Meningitis	Pulmonary tuberculosis
	EPIDEMIC DISEASES										
EAST CENTRAL DIST.—(*Cont'd*)											
Rest of county	13	....	....	12	2	11	3	15	4	2	20
Canastota, village (Madison Co.)	....	....	....	2	....	....	....	2	....	....	3
Cazenovia, town (Madison Co.)	....	....	....	....	....	....	....	1	....	....	2
Hamilton, town (Madison Co.)	....	....	....	....	....	....	....	2	....	....	1
Oneida (Madison Co.)	4	....	....	....	....	5	....	4	....	....	3
Rest of county	1	....	....	....	1	....	1	10	....	1	17
Baldwinsville, village (Onondaga Co.)	....	....	....	1	....	....	....	....	....	....	2
DeWitt, town (Onondaga Co.)	1	....	....	....	....	1	....	1	1	....	2
East Syracuse, village (Onondaga Co.)	2	....	....	....	....	1	....	....	....	....	2
Solvay, village (Onondaga Co.)	1	....	....	....	....	1	8	....	....	....	8
Syracuse (Onondaga Co.)	38	....	....	9	22	4	25	15	5	5	123
Rest of county	12	....	....	2	5	....	3	15	2	1	50
Copperstown, village (Otsego Co.)	....	....	....	....	....	....	....	4	....	....	3
Oneonta (Otsego Co.)	2	....	....	....	1	....	....	....	....	....	6
Worcester, town (Otsego Co.)	....	....	....	....	....	....	....	3	....	....	1
Rest of county	2	....	....	1	....	1	2	22	1	....	22
Liberty, town (Sullivan Co.)	4	....	....	....	....	1	1	5	....	....	111
Rest of county	5	....	....	....	7	1	1	12	1	....	78
Totals for the district	104	1	....	32	41	27	52	150	15	15	500
WEST CENTRAL DISTRICT:											
Auburn (Cayuga Co.)	3	....	....	3	5	1	6	2	4	....	41
Rest of county	16	1	....	....	1	....	2	13	1	....	26
Batavia village (Genesee Co.)	4	2	....	3	....	....	2	3	....	1	7
Le Roy, village (Genesee Co.)	1	....	....	1	....	....	....	2	....	....	4
Rest of county	3	....	....	1	....	....	1	7	....	....	15
Dansville, village (Livingston Co.)	1	....	....	....	....	1	....	....	....	1	4
Mt. Morris, village (Livingston Co.)	1	....	....	4	....	....	....	1	....	....	3
Rest of county	3	....	....	1	5	1	1	8	....	1	21
Canandaigua, village (Ontario Co.)	2	....	....	....	1	....	....	1	1	....	4
Geneva (Ontario Co.)	3	....	....	....	2	....	....	2	2	1	13
Manchester, town (Ontario Co.)	1	....	....	....	....	2	....	7	....	....	5
Phelps, town Ontario Co.)	....	....	....	....	....	....	....	1	....	....	1
Rest of county	3	....	....	1	....	1	2	5	....	....	13
Hector, town (Schuyler Co.)	....	....	....	....	....	....	....	3	....	....	2
Rest of county	1	....	....	....	....	2	....	6	1	....	7
Seneca Falls, village (Seneca Co.)	....	1	....	....	2	1	....	3	2	....	10
Waterloo, village (Seneca Co.)	....	....	....	....	....	....	....	3	....	....	4
Rest of county	1	....	....	1	....	....	1	4	1	....	15
Ithaca (Tompkins Co.)	5	1	....	....	2	....	....	6	....	....	15
Rest of county	2	....	....	....	1	1	....	12	....	....	14
Perry, village (Wyoming Co.)	1	....	....	....	....	....	....	2	....	....	3
Warsaw, town (Wyoming Co.)	3	....	....	....	....	....	....	....	....	....	....
Rest of county	6	....	....	4	1	....	2	6	....	....	12
Penn Yan, village (Yates Co.)	2	....	....	....	1	....	....	4	....	....	5
Rest of county	3	....	....	....	....	....	....	5	2	1	11
Totals for the district	65	5	....	19	21	10	17	106	14	5	255
LAKE ONTARIO AND WESTERN DISTRICT:											
Amherst, town (Erie Co.)	....	....	....	....	....	....	....	....	....	....	4
Buffalo (Erie Co.)	78	....	1	97	223	80	163	16	26	14	510
Depew, village (Erie Co.)	....	....	....	3	8	2	....	2	....	3	3
East Aurora, village (Erie Co.)	....	....	....	....	....	....	....	....	....	....	....
Lackawanna (Erie Co.)	1	....	....	23	14	1	7	1	3	1	18
Lancaster, village (Erie Co.)	....	....	....	2	1	....	....	1	....	....	5
Tonawanda (Erie Co.)	3	....	....	....	....	1	1	3	1	....	7
West Seneca, town (Erie Co.)	....	....	....	....	1	....	1	....	2	....	4
Rest of county	4	....	....	7	10	3	11	19	....	1	61
Brockport, village (Monroe Co.)	1	....	....	....	....	....	....	1	....	....	2

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Population U. S. census July 1, 1910	Total deaths	AGES					
			Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
MOHAWK VALLEY DISTRICT—(*Cont'd*)								
Frankfort, village (Herkimer Co.)	3,321	56	19	5	3	4	12	13
Herkimer, village (Herkimer Co.)	7,559	121	22	7	12	16	27	36
Ilion, village (Herkimer Co.)	6,616	90	12	1	5	16	11	45
Little Falls (Herkimer Co.)	12,326	194	29	11	18	23	41	71
Rest of county	26,650	406	45	18	12	47	67	217
Amsterdam (Montgomery Co.)	31,586	540	160	61	30	71	95	122
Fort Plains, village (Montgomery Co.)	2,769	61	10	0	1	11	10	29
Rest of county	23,547	390	44	17	14	46	77	192
Boonville, town (Oneida Co.)	3,193	57	7	2	4	5	8	31
Camden, town (Oneida Co.)	3,413	52	4	2	2	8	7	29
Rome (Oneida Co.)	20,632	411	71	21	14	49	79	177
Utica (Oneida Co.)	74,879	1,297	314	102	64	166	221	426
Whitestown, town (Oneida Co.)	7,838	107	28	12	1	18	12	36
Rest of county	44,786	638	69	21	25	65	94	364
Ballston Spa, village (Saratoga Co.)	4,138	74	15	1	3	6	16	33
Mechanicville, village (Saratoga Co.)	6,666	117	24	15	5	14	28	31
Saratoga Springs, village (Saratoga Co.)	12,680	255	35	16	9	42	59	94
Waterford, town (Saratoga Co.)	6,134	109	23	12	4	15	17	38
Rest of county	32,282	526	57	18	22	61	74	292
Schenectady (Schenectady Co.)	73,450	1,070	289	111	52	177	198	243
Rest of county	15,516	179	31	12	9	31	30	65
Cobleskill, town (Schoharie Co.)	3,574	57	4	2	4	7	12	28
Rest of county	20,223	338	32	16	13	27	47	201
Totals for the District	488,414	7,818	1,452	500	350	989	1,378	3,131
SOUTHERN TIER DISTRICT:								
Wellsville, village (Allegany Co.)	4,383	65	10	2	2	4	11	36
Rest of county	36,958	557	52	16	20	55	75	336
Binghamton (Broome Co.)	48,671	765	138	37	41	128	158	263
Lestershire, village (Broome Co.)	3,764	63	6	4	4	14	9	26
Rest of county	26,608	503	46	19	16	49	90	282
Olean (Cattaraugus Co.)	14,814	188	28	11	19	32	41	57
Salamanca, village (Cattaraugus Co.)	5,806	85	18	10	3	9	20	25
Rest of county	45,299	628	67	36	32	51	88	353
Dunkirk (Chautauqua Co.)	17,308	279	76	37	28	38	39	61
Fredonia, village (Chautauqua Co.)	5,290	79	15	4	2	8	9	41
Jamestown (Chautauqua Co.)	31,523	404	66	21	23	71	80	143
Westfield, village (Chautauqua Co.)	2,991	64	9	4	3	5	12	31
Rest of county	48,380	718	89	22	27	57	103	419
Elmira (Chemung Co.)	37,238	554	74	20	30	78	114	236
Horseheads, town (Chemung Co.)	5,398	76	3	2	1	8	13	49
Rest of county	12,115	236	36	10	6	31	41	110
Bath, village (Steuben Co.)	3,891	67	6	1	2	7	9	42
Corning (Steuben Co.)	13,742	200	30	8	12	34	41	75
Hornell (Steuben Co.)	13,637	174	20	7	14	21	40	72
Rest of county	52,112	780	76	21	30	59	122	466
Candor, town (Tioga Co.)	2,902	43	1	0	2	3	8	29
Owego, village (Tioga Co.)	4,617	54	4	0	0	3	16	31
Waverly, village (Tioga Co.)	4,853	83	7	3	8	11	10	44
Rest of county	13,204	224	19	8	6	13	41	136
Totals for the District	455,504	6,889	896	303	331	789	1,190	3,363
EAST CENTRAL DISTRICT:								
Norwich, village (Chenango Co.)	7,434	122	10	10	4	19	28	51
Rest of county	28,089	476	38	19	12	25	78	304
Cortland (Cortland Co.)	11,517	219	36	11	5	20	39	108
Homer, village (Cortland Co.)	2,701	49	2	1	1	5	9	31
Rest of county	15,026	260	21	12	9	11	37	169
Sidney, town (Delaware Co.)	4,142	72	4	1	3	10	17	37
Walton, town (Delaware Co.)	5,094	88	8	3	5	11	17	44

the State During 1910 — (Continued)

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal Meningitis	Pulmonary tuberculosis
MOHAWK VALLEY DIST.—(*Cont'd*)											
Frankfort, village (Herkimer Co.)				1			1	1			3
Herkimer, village (Herkimer Co.)				2		1	1				5
Ilion, village (Herkimer Co.)	1				1	1				1	4
Little Falls (Herkimer Co.)	1				3	2		3			10
Rest of county						3	2	11			34
Amsterdam (Montgomery Co.)	7			1	4	8	12	2	1	1	32
Fort Plain, village (Montgomery Co.)	2										3
Rest of county	2			1	1	3	3	6	5		25
Boonville, town (Oneida Co.)											3
Camden, town (Oneida Co.)				1				1			8
Rome (Oneida Co.)	4			3		2	10	7	1		26
Utica (Oneida Co.)	5			11		14	14	18	2	5	94
Whitestown, town (Oneida Co.)	2					1		3			9
Rest of county	5	1			1	3	6	6	2	1	52
Ballston Spa, village (Saratoga Co.)	2					2		3			5
Mechanicville, village (Saratoga Co.)	2			7			1	1	1	3	6
Saratoga Springs, vil. (Saratoga Co.)	2			4	2	1	2	5			22
Waterford, town (Saratoga Co.)	2				4		3	1			13
Rest of county	5			1	8	1	1	16	2	1	28
Schenectady (Schenectady Co.)	5			11	3	10	15	4	2	3	72
Rest of county				3		1	3	2		1	11
Cobleskill, town (Schoharie Co.)	1				1	1					4
Rest of county	1	1		6	1	5	2	10			18
Totals for the District	53	2		56	30	60	80	114	17	18	527
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany Co.)											2
Rest of county	7			4	2		1	17	2	1	15
Binghamton (Broome Co.)	6			4	3	5	11	5	4	1	58
Lestershire, village (Braome Co.)					1			1			4
Rest of county	5				7	1	2	10		1	31
Olean (Cattaraugus Co.)				2			5			1	7
Salamanca, village (Cattaraugus Co.)	1				2		1	2			3
Rest of county	6	1		6	3	1	3	16	4	2	30
Dunkirk (Chautauqua Co.)	4			4	25		9	2			11
Fredonia, village (Chautauqua Co.)	1			2	1			2			7
Jamestown (Chautauqua Co)	9			1	4	1	5	4		1	23
Westfield, village (Chautauqua Co.)				3	1		3				2
Rest of county	1			2	3	6	5	28	5	3	23
Elmira (Chemung Co.)	10	2			1	5	8	11		1	19
Horseheads, town (Chemung Co.)							1	1			10
Rest of county	4					1		9	1	1	25
Bath, village (Steuben Co.)	1										6
Corning (Steuben Co.)	8				1	1		1			7
Hornell (Steuben Co.)	5			3	1			5		1	5
Rest of county	4				4	5	1	16		2	27
Candor, town (Tioga Co.)										1	
Owego, village (Tioga Co.)											4
Waverly, village (Tioga Co.)								4			5
Rest of county	2				1			5			7
Totals for the District	74	3		31	60	26	55	139	16	16	331
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango Co.)		1					3	4		2	6
Rest of county	3			3		1	1	20	1	2	19
Cortland (Cortland Co.)	9						2	2		1	3
Homer, village (Cortland Co.)	1			1			1	2		1	1
Rest of county	2			1	2			5			9
Sidney, town (Delaware Co.)	3						1	1			5
Walton, town (Delaware Co.)	1				1			5			3

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and Enteritis: Under 2 years	Diarrhea and Enteritis: Over 2 years	Other diseases of the digestive system
MOHAWK VALLEY DIST.—(*Cont'd*)											
Frankfort, village (Herkimer Co.)...	1	1	2	1	4	10	5	7	7	....	1
Herkimer, village (Herkimer Co.)...	....	7	4	3	8	15	12	16	3	1	7
Ilion, village (Herkimer Co.).......	4	3	2	1	14	5	9	5	1	....	9
Little Falls (Herkimer Co.).........	2	5	6	4	14	31	19	10	11	1	11
Rest of county....................	4	24	9	13	60	60	19	16	12	8	23
Amsterdam (Montgomery Co.).....	6	15	7	12	44	39	54	32	89	11	30
Fort Plaine, village (Montgomery Co.)	1	3	2	2	4	8	1	4	2	2	6
Rest of county....................	2	20	6	17	53	41	36	21	9	3	20
Boonville, town (Oneida Co.)... ...	1	6	1	3	10	11	6	3	1	....	1
Camden, town (Oneida Co.)........	....	2	1	1	7	7	1	2	3	1	2
Rome (Oneida Co.)...............	11	23	2	17	55	58	19	18	27	4	28
Utica (Oneida Co.)...............	30	65	11	52	126	142	101	79	100	10	88
Whitestown, town (Oneida Co.)....	2	6	....	2	14	10	11	7	15	....	5
Rest of county....................	7	45	12	19	74	86	52	35	16	6	47
Ballston Spa, village (Saratoga Co.)..	....	4	....	2	12	8	3	5	8	2	3
Mechanicville, village (Saratoga Co.)	2	4	....	1	8	13	4	15	7	1	5
Saratoga Springs, vil. (Saratoga Co.).	2	22	3	8	21	25	19	19	10	....	19
Waterford, town (Saratoga Co.).....	....	3	1	3	13	9	8	7	5	2	4
Rest of county....................	6	33	5	22	75	64	40	30	19	3	23
Schenectady (Schenectady Co.).....	14	41	10	50	90	84	108	74	115	12	59
Rest of county....................	4	11	1	6	20	17	13	6	15	2	4
Cobleskill, town (Schoharie Co.).....	1	5	....	6	6	8	5	3	....	....	3
Rest of county....................	1	20	3	9	66	44	23	17	3	2	17
Totals for the District..........	108	411	95	277	887	859	618	463	504	75	477
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany Co.)....	....	4	2	3	5	7	4	6	3	2	4
Rest of county....................	1	30	8	25	75	89	27	31	9	10	35
Binghamton (Broome Co.)..........	4	41	8	35	77	81	62	39	39	17	55
Lestershire, village (Broome Co.)....	1	4	....	1	4	4	4	4	2	2	6
Rest of county....................	5	32	2	20	84	71	27	23	8	7	35
Olean (Cattaraugus Co.)...........	3	17	2	8	19	22	16	6	9	....	19
Salamanca, village (Cattaraugus Co.).	1	6	....	4	10	5	5	2	6	1	4
Rest of county....................	6	46	9	21	95	89	48	37	16	13	41
Dunkirk (Chautauqua Co.)..........	6	13	1	6	29	18	25	9	23	2	21
Fredonia, village (Chautauqua Co.).	2	2	1	4	18	5	4	6	7	....	3
Jamestown (Chautauqua Co.)......	10	21	4	14	43	47	30	23	8	6	31
Westfield, village (Chautauqua Co.).	....	7	....	....	9	13	3	....	3	1	2
Rest of county....................	12	48	13	19	85	124	42	37	27	7	40
Elmira (Chemung Co.)............	7	38	6	18	62	63	33	30	14	4	29
Horseheads, town (Chemung Co.)....	....	5	....	4	13	5	9	3	1	3	2
Rest of county....................	2	11	6	10	26	31	13	10	6	1	10
Bath, village (Steuben Co.).........	1	5	....	5	7	12	5	1	1	....	4
Corning (Steuben Co.)............	2	6	4	5	29	20	18	9	4	3	24
Hornell (Steuben Co.).............	2	9	1	8	26	26	14	3	4	1	10
Rest of county....................	4	53	7	31	128	134	41	31	18	19	48
Candor, town (Tioga Co.).........	....	2	3	3	7	1	2	4	1	....	4
Owego, village (Tioga Co.)........	....	3	1	2	7	9	3	3	2	2	5
Waverly, village (Tioga Co.).......	1	4	....	2	15	10	4	6	3	....	5
Rest of county....................	4	11	5	9	37	32	11	10	7	6	16
Totals for the District..........	74	418	83	257	910	918	450	333	221	107	453
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango Co.)....	2	9	....	6	14	10	12	14	6	2	7
Rest of county....................	2	25	6	23	65	72	21	24	10	14	43
Cortland (Cortland Co.)...........	....	14	2	8	26	25	21	10	4	1	11
Homer, village (Cortland Co.)......	1	2	....	2	5	6	7	3	....	1	3
Rest of county....................	2	16	4	7	38	33	20	16	3	2	15
Sidney, town (Delaware Co.).......	....	4	....	2	10	5	4	2	2	....	11
Walton, town (Delaware Co.).......		5	.	3	7	5	14	3	....	2	5

MOHAWK VALLEY DISTRICT—Con.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Frankfort, village (Herkimer Co.)											
Herkimer, village (Herkimer Co.)											
Ilion, village (Herkimer Co.)	[illegible]		[illegible]		[illegible]				[illegible]		
Little Falls (Herkimer Co.)	[illegible]	[illegible]	[illegible]		[illegible]					[illegible]	[illegible]
Rest of county	[illegible]		[illegible]		[illegible]				[illegible]		
Amsterdam (Montgomery Co.)	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]			[illegible]	[illegible]	[illegible]
Fort Plain, village (Montgomery Co.)	[illegible]	[illegible]			[illegible]	[illegible]			[illegible]	[illegible]	[illegible]
Rest of county	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]		
Boonville, town (Oneida Co.)					[illegible]	[illegible]			[illegible]	[illegible]	
Camden, town (Oneida Co.)	[illegible]	[illegible]			[illegible]					[illegible]	[illegible]
Rome (Oneida Co.)	15			[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Utica (Oneida Co.)	[illegible]	38	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Whitestown, town (Oneida Co.)	[illegible]	[illegible]			[illegible]	[illegible]			[illegible]	[illegible]	
Rest of county	3[illegible]	2[illegible]	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Ballston Spa, village (Saratoga Co.)	[illegible]		1		4				[illegible]	[illegible]	[illegible]
Mechanicville, village (Saratoga Co.)	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
Saratoga Springs, vil. (Saratoga Co.)	[illegible]	4	5		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
Waterford, town (Saratoga Co.)		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rest of county	[illegible]	1	[illegible]	1	[illegible]	[illegible]		[illegible]	[illegible]		
Schenectady (Schenectady Co.)	6[illegible]	[illegible]	1[illegible]	1[illegible]	[illegible]	1[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]
Rest of county	14	[illegible]	[illegible]	[illegible]	[illegible]	3		[illegible]	[illegible]		
Cobleskill, town (Schoharie Co.)	3	[illegible]	1	[illegible]	1			1	1	44	1
Rest of county	34	[illegible]		[illegible]	1[illegible]	3	1	1[illegible]	11		
Totals for the District	577[illegible]	[illegible]	6[illegible]	141	44[illegible]	[illegible]	14	10[illegible]	[illegible]		
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany Co.)	8	1	1	2	3	2		[illegible]	4	[illegible]	[illegible]
Rest of county	49	10	9	9	[illegible]	[illegible]	2	[illegible]	[illegible]		
Binghamton (Broome Co.)	65	12	12	13	30	13	2	1[illegible]	[illegible]	[illegible]	44
Lestershire, village (Broome Co.)	6	4	3		2	2		2	[illegible]	40	[illegible]
Rest of county	35	16	3		28	[illegible]		10	[illegible]		
Olean (Cattaraugus Co.)	8	5	3		1[illegible]	5	1	4	11	[illegible]	[illegible]
Salamanca, village (Cattaraugus Co.)	3	1	..		13	3		[illegible]	[illegible]	[illegible]	[illegible]
Rest of county	37	14	8	4	24	5		10	[illegible]		
Dunkirk (Chautauqua Co.)	4	7	1		20	2	1	2	10	[illegible]	[illegible]
Fredonia, village (Chautauqua Co.)	2	1	1		3			2	1	[illegible]	[illegible]
Jamestown (Chautauqua Co.)	43	9	8		20	2		[illegible]	[illegible]	[illegible]	[illegible]
Westfield, village (Chautauqua Co.)	3	4	..		2			5	1	[illegible]	1
Rest of county	51	13	4	1	4[illegible]	5	1	1[illegible]	2[illegible]		
Elmira (Chemung Co.)	89	17	4	4	30	8	1	4	[illegible]	[illegible]	[illegible]
Horseheads, town (Chemung Co.)	7	1	..		3			5	[illegible]	[illegible]	4
Rest of county	17	9	4	2	14	3		4	10		
Bath, village (Steuben Co.)	6	2	1	1	1			3	[illegible]	[illegible]	1
Corning (Steuben Co.)	10	9	1	3	10	1		7	11	[illegible]	[illegible]
Hornell (Steuben Co.)	9	10	3	5	14	1		1	[illegible]	[illegible]	11
Rest of county	58	15	6	10	2[illegible]	12	2	1[illegible]	[illegible]		
Candor, town (Tioga Co.)	4	3	.		1	1		[illegible]		40	[illegible]
Owego, village (Tioga Co.)	4	2	.	1				4	[illegible]	[illegible]	1
Waverly, village (Tioga Co.)	[illegible]	[illegible]	.	2	[illegible]	1		1	1	[illegible]	[illegible]
Rest of county	1[illegible]	8	21	1	[illegible]	[illegible]		[illegible]	[illegible]		
Totals for the District	53[illegible]	17[illegible]	74	[illegible]	[illegible]	[illegible]	10	21[illegible]	[illegible]		
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango Co.)	[illegible]	1	2	1	7			[illegible]	[illegible]	[illegible]	[illegible]
Rest of county	43	11	4	[illegible]	17	1	[illegible]	[illegible]	[illegible]		
Cortland (Cortland Co.)	24	5	2	5	14	2	1	[illegible]	[illegible]	[illegible]	[illegible]
Homer, village (Cortland Co.)	[illegible]	3			2			4		[illegible]	1
Rest of county	[illegible]	13	1	4	12	4		[illegible]	[illegible]		
Sidney, town (Delaware Co.)	[illegible]	2	2		4	2		[illegible]	[illegible]	[illegible]	1
Walton, town (Delaware Co.)	[illegible]	3		[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and Enteritis: Under 2 years	Diarrhea and Enteritis: Over 2 years	Other diseases of the digestive system
EAST CENTRAL DIST.—(*Cont'd*)											
Rest of county	6	39	4	21	76	68	47	29	13	11	44
Canastota, village (Madison Co.)	2	5	.....	2	7	10	2	1	3	1	5
Casenovia, town (Madison Co.)	2	4	2	6	15	6	1	4	.....	.....	3
Hamilton, town (Madison Co.)	2	5	2	2	8	13	2	3	4	1	2
Oneida (Madison Co.)	.....	9	1	9	11	14	7	7	5	5	6
Rest of county	2	17	2	13	54	57	26	11	8	3	25
Baldwinsville, village (Onondaga Co.)	.....	2	2	2	6	10	3	1	1	1	4
DeWitt, town (Onondaga Co.)	.....	4	.....	2	10	7	3	2	.....	.....	4
East Syracuse, village (Onondaga Co.)	4	2	.....	.....	6	5	7	1	3	.....	4
Solvay, village (Onondaga Co.)	1	3	.....	3	10	8	5	5	11	1	2
Syracuse (Onondaga Co.)	27	125	24	83	179	293	144	121	166	23	124
Rest of county	7	40	5	23	100	126	33	44	19	9	43
Cooperstown, village (Otsego Co.)	.....	4	2	5	5	8	7	2	.....	1	5
Oneonta (Otsego Co.)	1	13	6	9	17	21	17	5	9	2	10
Worcester, town (Otsego Co.)	.....	2	1	1	4	10	3	3	3	.....	2
Rest of county	9	33	6	17	92	88	36	20	11	8	33
Liberty, town (Sullivan Co.)	3	2	1	1	10	17	10	4	4	.....	3
Rest of county	7	11	6	19	57	52	34	31	24	6	26
Totals for the District	80	395	81	269	832	969	486	366	309	94	440
WEST CENTRAL DISTRICT:											
Auburn (Cayuga Co.)	4	39	5	18	48	63	40	29	36	9	27
Rest of county	6	30	7	15	78	77	25	21	11	7	21
Batavia, village (Genesee Co.)	1	17	4	7	26	30	18	11	9	2	8
Le Roy, village (Genesee Co.)	.....	3	.....	2	7	6	4	1	2	1	4
Rest of county	3	19	6	17	49	51	20	17	14	3	15
Dansville, village (Livingston Co.)	1	4	1	1	11	10	3	3	4	3	4
Mt. Morris, village (Livingston Co.)	.....	.....	.....	3	3	4	3	5	8	3	4
Rest of county	7	25	4	16	67	52	13	28	12	9	23
Canandaigua, village (Ontario Co.)	5	21	2	4	22	15	12	8	4	2	4
Geneva (Ontario Co.)	1	11	1	5	26	27	12	11	4	1	10
Manchester, town (Ontario Co.)	1	11	3	4	21	12	3	4	2	1	8
Phelps, town (Ontario Co.)	.....	5	1	2	11	7	4	4	3	1	4
Rest of county	3	17	5	10	47	41	10	15	9	4	15
Hector, town (Schuyler Co.)	.....	2	1	4	9	8	3	3	2	.....	3
Rest of county	2	11	.....	7	19	21	8	7	2	2	11
Seneca Falls, village (Seneca Co.)	2	6	3	6	13	17	5	4	3	4	5
Waterloo, village (Seneca Co.)	.....	7	1	2	6	5	4	6	.....	.....	1
Rest of county	4	13	2	4	39	41	16	12	5	5	15
Ithaca (Tompkins Co.)	4	16	2	11	35	29	11	10	6	3	12
Rest of county	4	31	.....	14	42	54	18	12	3	5	16
Perry, village (Wyoming Co.)	.....	2	2	3	7	11	3	.....	2	.....	8
Warsaw, town (Wyoming Co.)	1	2	3	5	9	5	1	2	1	2	5
Rest of county	1	20	4	14	49	78	23	17	15	6	22
Penn Yan, village (Yates Co.)	1	3	.....	3	9	14	3	6	1	.....	1
Rest of county	2	10	4	6	39	27	16	9	6	3	9
Totals for the District	53	325	61	183	692	705	278	245	164	76	255
LAKE ONTARIO AND WESTERN DISTRICT:											
Amherst, town (Erie Co.)	2	7	2	.....	12	7	5	2	5	.....	4
Buffalo (Erie Co.)	74	305	73	362	672	899	110	761	264	.....	664
Depew, village (Erie Co.)	.....	1	.....	2	3	2	5	11	16	.....	5
East Aurora, village (Erie Co.)	.....	6	1	2	2	11	3	2	2	1	2
Lackawanna (Erie Co.)	9	3	.....	40	9	16	30	19	98	4	11
Lancaster, village (Erie Co.)	.....	4	1	3	7	6	7	5	6	2	2
Tonawanda (Erie Co.)	3	5	1	4	14	11	7	6	5	1	7
West Seneca, town (Erie Co.)	.....	1	.....	1	6	7	3	2	5	.....	5
Rest of county	9	48	9	26	96	105	63	55	34	13	44
Brockport, village (Monroe Co.)	1	4	1	.....	6	10	3	2	1	.....	5

the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Brights disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
EAST CENTRAL DIST.—(*Cont'd*)											
Rest of county	27	8	8	5	33	9	....	19	17	....	....
Canastota, village (Madison Co.)	....	1	1	1	7	....	1	2	4	67	3
Casenovia, town (Madison Co.)	1	....	....	3	6	1	....	5	3	58	2
Hamilton, town (Madison Co.)	5	2	....	....	1	1	....	....	5	69	1
Oneida (Madison Co.)	4	2	....	2	9	1	....	2	8	157	5
Rest of county	11	8	3	2	12	3	1	14	10	....	....
Baldwinsville, village (Onondaga Co.)	5	1	....	....	4	2	1	2	2	42	1
DeWitt, town (Onondaga Co.)	3	....	....	....	3	....	....	1	3	47	7
East Syracuse, village (Onondaga Co.)	1	....	....	....	5	1	....	1	2	89	0
Solvay, village (Onondaga Co.)	2	....	....	2	3	....	....	....	3	93	10
Syracuse (Onondaga Co.)	160	42	22	38	126	31	5	21	124	2,797	126
Rest of county	47	9	6	6	45	10	....	21	26	....	....
Cooperstown, village (Otsego Co.)	8	2	....	....	....	1	....	....	1	50	2
Oneonta (Otsego Co.)	10	7	....	3	27	3	....	4	8	190	6
Worcester, town (Otsego Co.)	2	1	....	....	3	....	....	6	4	51	0
Rest of county	63	22	3	9	15	6	....	22	15	....	....
Liberty, town (Sullivan Co.)	4	5	1	1	3	2	....	4	3	104	0
Rest of county	26	11	3	9	18	4	....	14	8	....	....
Totals for the District	507	159	58	98	381	86	11	181	307	....	....
WEST CENTRAL DISTRICT:											
Auburn (Cayuga Co.)	34	13	5	9	19	8	1	22	28	645	20
Rest of county	34	10	2	7	22	12	....	15	17	....	....
Batavia, village (Genesee Co.)	10	6	4	7	11	....	....	7	6	222	11
Le Roy, village (Genesee Co.)	1	....	1	....	2	....	....	1	4	90	3
Rest of county	24	8	2	3	24	2	....	21	12	....	....
Dansville, village (Livingston Co.)	7	4	....	1	2	4	....	2	2	58	2
Mt. Morris, village (Livingston Co.)	4	....	2	....	3	1	....	1	5	62	2
Rest of county	21	9	3	10	30	2	....	22	15	....	....
Canandaigua, village (Ontario Co.)	10	5	....	3	11	4	....	4	12	184	5
Geneva (Ontario Co.)	13	1	1	2	12	1	1	8	4	235	13
Manchester, town (Ontario Co.)	10	6	....	....	4	2	....	4	5	96	3
Phelps, town (Ontario Co.)	3	1	....	....	2	1	1	1	1	67	4
Rest of county	23	12	1	5	10	3	1	14	9	....	....
Hector, town (Schuyler Co.)	5	3	....	2	2	1	....	1	5	48	3
Rest of county	12	6	2	2	9	1	....	11	6	....	....
Seneca Falls, village (Seneca Co.)	6	7	....	....	7	....	1	1	5	128	0
Waterloo, village (Seneca Co.)	4	3	1	....	1	....	1	3	....	62	1
Rest of county	25	6	3	3	13	1	....	8	8	....	....
Ithaca (Tompkins Co.)	26	13	1	2	16	2	1	5	10	237	9
Rest of county	21	7	3	3	23	3	....	7	8	....	....
Perry, village (Wyoming Co.)	1	....	....	2	1	....	....	4	6	61	3
Warsaw, town (Wyoming Co.)	1	....	....	....	....	3	....	7	1	57	2
Rest of county	21	6	5	5	14	5	....	16	7	....	....
Penn Yan, village (Yates Co.)	3	....	....	2	5	....	....	6	1	76	2
Rest of county	20	....	2	3	7	5	....	10	10	....	....
Totals for the District	339	126	38	71	250	61	7	201	187	....	....
LAKE ONTARIO AND WESTERN DISTRICT:											
Amherst, town (Erie Co.)	9	....	....	....	3	1	....	....	2	76	3
Buffalo (Erie Co.)	277	144	132	38	270	59	16	121	428	10,008	393
Depew, village (Erie Co.)	1	....	2	5	7	....	....	....	4	167	4
East Aurora, village (Erie Co.)	3	....	....	1	1	....	....	2	2	46	2
Lackawanna (Erie Co.)	3	6	....	15	40	....	1	3	21	389	15
Lancaster, village (Erie Co.)	2	4	....	1	5	....	....	1	2	96	5
Tonawanda (Erie Co.)	3	2	1	1	11	1	....	4	3	168	7
West Seneca, town (Erie Co.)	6	1	....	2	8	....	....	4	4	93	2
Rest of county	48	25	7	21	62	4	2	26	32	....	....
Brockport, village (Monroe Co.)	6	2	....	....	1	....	....	3	1	67	

Total Mortality for the Year 1910 in

SANITARY DISTRICTS	Population U. S. census July 1, 1910	Total deaths	Ages					
			Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)								
Fairport, village (Monroe Co.)	3,133	48	10	2	2	4	5	25
Rochester (Monroe Co.)	219,693	3,084	445	206	168	479	716	1,070
Rest of county	58,676	781	141	41	35	93	104	366
Lockport (Niagara Co.)	17,993	299	36	9	20	42	54	131
Niagara Falls (Niagara Co.)	30,617	551	143	59	33	120	107	88
North Tonawanda (Niagara Co.)	12,033	160	57	28	9	20	13	32
Rest of county	31,719	392	52	13	15	36	68	205
Albion, village (Orleans Co.)	5,010	85	12	2	1	9	13	48
Medina, village (Orleans Co.)	5,707	101	18	7	4	5	19	48
Rest of county	21,309	314	30	19	8	28	52	177
Fulton (Oswego Co.)	10,550	155	31	7	13	25	18	61
Oswego (Oswego Co.)	23,410	385	76	17	24	52	65	151
Richland, town (Oswego Co.)	3,799	60	5	2	2	5	6	40
Rest of county	33,986	523	48	23	19	36	83	312
Clyde, village (Wayne Co.)	2,701	38	2	0	1	2	6	27
Lyons, village (Wayne Co.)	4,446	75	11	7	2	8	13	34
Newark, village (Wayne Co.)	6,274	85	7	1	3	21	14	39
Palmyra, town (Wayne Co.)	4,175	71	8	1	2	6	9	45
Rest of county	32,637	497	67	11	18	37	81	232
Totals for the District	1,062,783	16,300	3,174	1,294	912	2,292	3,083	5,526
Totals for the State	*9,158,328*	*147,629*	*27,457*	*12,233*	*8,069*	*23,340*	*30,557*	*45,799*
Deaths in State institutions	....	*1,992	0	3	43	404	655	882

* Previous to March these deaths were classified in "Rest of county" in which each institution is located.

the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary Tuberculosis
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)											
Fairport, village (Monroe Co.)						1			1		2
Rochester (Monroe Co.)	30	1		15	47	10	34	17	14	9	277
Rest of county	8				7	7	9	11	2		41
Lockport (Niagara Co.)	2			3	3		4	1	1	1	25
Niagara Falls (Niagara Co.)	30			14	5	9	10	6		2	32
North Tonawanda (Niagara Co.)	5			2	3		7	1			8
Rest of county	5				5	3	1	6	2	2	20
Albion, village (Orleans Co.)	2					1	1				9
Medina, village (Orleans Co.)					1	1			1		1
Rest of county	1				1	1	1	11			25
Fulton (Oswego Co.)	1			1		1	3	6			13
Oswego (Oswego Co.)	12					5	1				17
Richland, town (Oswego Co.)						1					2
Rest of county	4				1	5	1	11		1	33
Clyde, village (Wayne Co.)							1				1
Lyons, village (Wayne Co.)	1					2		1			3
Newark, village (Wayne Co.)				1		2		5	3		6
Palmyra, town (Wayne Co.)	1							2			4
Rest of county	6			1	1			13	1	3	19
Totals for the District	195	1	1	169	331	136	256	134	57	37	1,152
Totals for the State	*1,374*	*65*	*7*	*1,285*	*1,617*	*727*	*2,433*	*1,452*	*52*	*452*	*14,059*
Deaths in State institutions	13			1	6			7	11	2	172

Total Mortality for the [illegible]r 1910 in

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	DIARRHEA AND ENTERITIS: Under 2 years	DIARRHEA AND ENTERITIS: Over 2 years	Other diseases of the digestive system
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)											
Fairport, village (Monroe Co.)	....	2	....	2	12	3	3	1	2	....	2
Rochester (Monroe Co.)	57	43	29	105	270	415	153	254	203	35	203
Rest of county	13	47	4	21	93	111	28	48	70	10	37
Lockport (Niagara Co.)	4	12	5	10	33	49	20	20	11	4	20
Niagara Falls (Niagara Co.)	13	14	4	28	41	40	37	29	45	8	26
North Tonawanda (Niagara Co.)	4	6	....	7	13	7	8	18	21	1	10
Rest of county	4	26	4	21	57	55	23	20	9	5	21
Albion, village (Orleans Co.)	....	6	1	2	16	6	5	6	5	2	1
Medina, village (Orleans Co.)	3	8	....	6	16	8	4	8	5	1	8
Rest of county	7	21	1	13	30	49	24	22	9	3	13
Fulton (Oswego Co.)	2	7	1	6	15	14	9	6	7	3	17
Oswego (Oswego Co.)	5	20	1	12	59	43	19	11	18	7	32
Richland, town (Oswego Co.)	2	3	1	5	11	9	2	2	....	1	7
Rest of county	4	33	3	26	75	84	35	22	1[illegible]	5	32
Clyde, village (Wayne Co.)	....	5	2	....	....	14	3	....	....	....	1
Lyons, village (Wayne Co.)	1	6	1	1	13	6	8	5	4	1	3
Newark, village (Wayne Co.)	....	3	....	7	6	14	4	5	1	....	6
Palmyra, town (Wayne Co.)	1	3	1	6	11	12	4	4	2	....	4
Rest of county	3	20	7	13	95	70	23	27	19	[illegible]	39
Totals for the District	221	83[illegible]	153	731	1,69[illegible]	2,083	646	1,373	884	11[illegible]	1,231
Totals for the State	*2,278*	*7,522*	*1,498*	*5,057*	*11,404*	*19,497*	*9,867*	*11,662*	*9,036*	*1,647*	*7,691*
Deaths in State institutions	22	38	5	27	485	30[illegible]	123	236	1	98	63

the Sanitary Districts — (Concluded)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
LAKE ONTARIO AND WESTERN DISTRICT—*(Continued)*											
Fairport, village (Monroe Co.)	....	3	....	4	3	....	....	5	2	42	1
Rochester (Monroe Co.)	251	90	39	34	136	37	7	33	66	4,999	230
Rest of county	42	12	7	12	53	15	1	29	43	....	....
Lockport (Niagara Co.)	15	5	1	6	22	2	....	9	11	342	23
Niagara Falls (Niagara Co.)	24	8	2	12	59	9	2	9	33	811	35
North Tonawanda (Niagara Co.)	4	3	2	2	11	1	1	2	13	332	1
Rest of county	22	12	3	6	20	5	....	17	18	....	....
Albion, village (Orleans Co.)	7	2	....	1	2	3	....	4	3	66	2
Medina, village (Orleans Co.)	8	3	....	1	7	....	....	4	7	88	5
Rest of county	29	7	2	2	13	4	....	8	17	....	....
Fulton (Oswego Co.)	7	7	1	4	12	2	....	3	7	242	15
Oswego (Oswego Co.)	36	10	5	5	25	6	....	10	26	488	21
Richland, town (Oswego Co.)	4	1	1	....	4	....	....	1	3	50	5
Rest of county	36	17	3	7	20	5	....	28	17	....	....
Clyde, village (Wayne Co.)	5	....	....	....	....	....	....	4	2	55	3
Lyons, village (Wayne Co.)	2	1	1	1	5	....	....	6	3	74	3
Newark, village (Wayne Co.)	7	1	2	....	6	1	....	2	3	79	4
Palmyra, town (Wayne Co.)	2	1	....	2	8	....	....	1	2	72	3
Rest of county	31	13	2	10	20	5	....	29	20	....	....
Totals for the District	890	380	213	193	834	160	30	368	795	....	....
Totals for the State	*9,711*	*3,100*	*1,452*	*4,599*	*7,695*	*1,479*	*420*	*3,182*	*4,835*	*213,235*	*9,952*
Deaths in State institutions	138	40	....	....	21	12	1	20	42	....	....

Total Mortality in Cities for the Year 1910 —(Concluded)

	Population U. S. census July 1, 1910	Total deaths	Annual rate per 1,000 population	AGES					
				Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
Third-class cities, under 10,000	*35,480*	*575*	*16.2*	*92*	*18*	*27*	*85*	*106*	*243*
Oneonta	9,552	181	18.9	27	4	7	35	28	77
Port Jervis	9,304	170	18.3	25	7	13	25	34	65
Oneida	8,316	118	14.2	20	6	3	8	24	57
Tonawanda	8,308	106	12.8	20	1	4	17	20	44
TOTAL URBAN MORTALITY	*6,849,203*	*110,058*	*16.1*	*22,721*	*10,567*	*6,392*	*18,933*	*24,107*	*27,264*
TOTAL RURAL MORTALITY	*2,309,125*	*37,571*	*16.3*	*4,736*	*1,666*	*1,677*	*4,407*	*6,450*	*18,515*

Total Mortality in Cities for the Year 1910 — (Continued)

	EPIDEMIC DISEASES										
	Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
First-class cities, over 175,000	*666*	*27*	*6*	*886*	*1,222*	*384*	*1,912*	*399*	*369*	*317*	*947*
City of New York	*558*	*26*	*5*	*774*	*952*	*294*	*1,715*	*366*	*320*	*294*	*8,690*
BOROUGH OF MANHATTAN	269	7	4	271	448	154	898	162	23[illegible]	177	3,976
BOROUGH OF THE BRONX	41	3		45	75	23	136	26	16	29	1,779
BOROUGH OF BROOKLYN	198	13	1	422	384	92	558	144	72	72	2,429
BOROUGH OF QUEENS	39	3		30	33	21	104	24	5	12	358
BOROUGH OF RICHMOND	1			6	12	4	19	10	3	4	148
Buffalo	78		1	97	223	80	163	16	26	14	510
Rochester	30	1		15	47	10	34	17	14	9	277
Second-class cities, 50,000 to 175,000	*93*	*1*		*70*	*69*	*49*	*112*	*95*	*15*	*23*	*823*
Syracuse	38			9	22	4	25	15	5	5	123
Albany	15			24	9	9	17	29	4		239
Yonkers	15	1			18	8	28	5	2	1	120
Troy	15			15	17	4	13	24		9	175
Utica	5			11		14	14	18	2	5	94
Schenectady	5			11	3	10	15	4	2	3	72
Third-class cities, 20,000 to 50,000	*152*	*2*		*63*	*62*	*65*	*112*	*77*	*21*	*21*	*523*
Binghamton	6			4	3	5	11	5	4	1	58
Elmira	10	2			1	5	8	11		1	19
Auburn	3			3	5	1	6	2	4		41
Amsterdam	7			1	4	8	12	2	1	1	32
Jamestown	9			1	4	1	5	4		1	23
Mt. Vernon	3			1	2	4	6	4			34
Niagara Falls	30			14	5	9	10	6		2	32
New Rochelle	1			6		8	8	1	1		24
Poughkeepsie	5			1		7	4	2	2	2	35
Newburgh	12			5	3	4	5	5		4	50
Watertown	24			15			3	4	3	1	21
Kingston	5			2	2	5	7	14	4	3	46
Cohoes	19			3	32	1	13	4	1	3	49
Oswego	12					5	1				17
Gloversville	2			4	1		3	6		2	16
Rome	4			3		2	10	7	1		26
Third-class cities, 10,000 to 20,000	*95*	*8*		*75*	*69*	*32*	*64*	*61*	*11*	*14*	*385*
Lockport	2			3	3		4	1	1	1	25
Dunkirk	4			4	25		9	2			11
White Plains, village	5	1			1	1	3	1	1		16
Ogdensburg	6				1		4	1	1	2	17
Peekskill, village	4	1		9	2	3		2	3		23
Middletown	4				3		2	1		1	27
Glens Falls	2	2			1	1		4		1	18
Watervliet	7			6	2		2	3			21
Ithaca	5	1			2			6			15
Olean				2			5			1	7
Lackawanna	1			23	14	1	7	1	3	1	18
Corning	8				1	1		1			7
Hornell	5			3	1			5		1	5
Portchester, village	2			4		5	6	2		1	9
Saratoga Springs, village	2			4	2	1	2	5			22
Geneva	3				2			2	2	1	13
Little Falls	1				3	2		3			10
North Tonawanda	5			2	3		7	1			8
Batavia, village	4	2		3			2	3		1	7
Ossining, village	2			6			3	1			15
Cortland	9						2	2		1	3
Hudson	6					1	2			1	26
Plattsburgh	3			4	2	8		2		1	23
Rensselaer	3	1		1	1	7	1	3			15
Fulton	1			1		1	3	6			13
Johnstown	1							3			11

The Mortality in Cities for the Year 1910 — (Concluded)

	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and Enteritis: Under 2 years	Diarrhea and Enteritis: Over 2 years	Other diseases of the digestive system
Third-class cities, under 10,000	*5*	*37*	*9*	*34*	*66*	*68*	*41*	*22*	*24*	*10*	*34*
Oneonta	1	13	6	9	17	21	17	5	9	2	10
Port Jervis	1	10	1	12	24	12	10	4	5	2	11
Oneida		9	1	9	11	14	7	7	5	5	6
Tonawanda	3	5	1	4	14	11	7	6	5	1	7
TOTAL URBAN MORTALITY	*1,853*	*5,447*	*1,093*	*3,785*	*6,233*	*14,542*	*7,481*	*9,502*	*7,665*	*1,035*	*5,658*
TOTAL RURAL MORTALITY	*425*	*2,075*	*405*	*1,272*	*5,171*	*4,955*	*2,386*	*2,160*	*1,371*	*612*	*2,033*

Total Mortality in Cities for the Year 1910 — (Concluded)

	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Annual rate per 1,000 population	BIRTHS: Still births
Third-class cities, under 10,000...	*24*	*15*	*5*	*11*	*63*	*8*	.....	*15*	*28*	*681*	*19.2*	*25*
Oneonta..................	10	7	.....	3	27	3	.....	4	8	190	19.9	6
Port Jervis...............	7	4	4	5	16	3	.....	5	9	166	17.8	7
Oneida...................	4	2	.....	2	9	1	.....	2	8	157	18.9	5
Tonawanda...............	3	2	1	1	11	1	.....	4	3	168	20.2	7
TOTAL URBAN MORTALITY	*7,051*	*2,254*	*1,162*	*4,041*	*5,572*	*1,073*	*355*	*1,984*	*3,279*	*173,010*	*25.5*	*8,583*
TOTAL RURAL MORTALITY	*2,660*	*846*	*290*	*558*	*2,123*	*406*	*65*	*1,198*	*1,556*	*40,22[illegible]*	*17.4*	*1,369*

Total Mortality in Cities for the Year 1910 —(Concluded)

	Population U. S. census July 1, 1910	Total deaths	Annual rate per 1,000 population	Ages					
				Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
Third-class cities, under 10,000	***35,480***	*575*	*16.2*	*92*	*18*	*27*	*85*	*106*	*243*
Oneonta	**9,552**	181	18.9	27	4	7	35	28	77
Port Jervis	**9,304**	170	18.3	25	7	13	25	34	65
Oneida	**8,316**	118	14.2	20	6	3	8	24	57
Tonawanda	**8,308**	106	12.8	20	1	4	17	20	44
TOTAL URBAN MORTALITY	***6,849,203***	*110,058*	*16.1*	*22,721*	*10,567*	*6,392*	*18,933*	*24,107*	*27,284*
TOTAL RURAL MORTALITY	***2,309,125***	*37,571*	*16.3*	*4,736*	*1,666*	*1,677*	*4,407*	*6,450*	*18,515*

Total Mortality in Cities for the Year 1910 — (Concluded)

	Epidemic Diseases										
	Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
Third-class cities, under 10,000	*15*	....	....	....	*2*	*6*	*2*	*13*	*1*	....	*27*
Oneonta	2	....		....	1	....	....	....	....	....	6
Port Jervis	6	....	....	....	1	....	1	6	....	....	11
Oneida	4	....	....	....	....	5	....	4	....	....	3
Tonawanda	3	....	....	....	....	1	1	3	1	....	7
TOTAL URBAN MORTALITY	*1,021*	*38*	*6*	*1,094*	*1,424*	*536*	*2,202*	*645*	*417*	*375*	*11,235*
TOTAL RURAL MORTALITY	*353*	*27*	*1*	*191*	*193*	*191*	*231*	*807*	*109*	*77*	*2,824*

The Mortality in Cities for the Year 1910 — (Concluded)

	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	DIARRHEA AND ENTERITIS		Other diseases of the digestive system
									Under 2 years	Over 2 years	
Third-class cities, under 10,000	*5*	*37*	*9*	*34*	*66*	*58*	*41*	*22*	*24*	*10*	*34*
Oneonta	1	13	6	9	17	21	17	5	9	2	10
Port Jervis	1	10	1	12	24	12	10	4	5	2	11
Oneida	.....	9	1	9	11	14	7	7	5	5	6
Tonawanda	3	5	1	4	14	11	7	6	5	1	7
TOTAL URBAN MORTALITY	*1,853*	*5,447*	*1,093*	*3,785*	*6,233*	*14,542*	*7,481*	*9,502*	*7,665*	*1,055*	*5,658*
TOTAL RURAL MORTALITY	*425*	*2,075*	*405*	*1,272*	*5,171*	*4,955*	*2,386*	*2,160*	*1,371*	*612*	*2,033*

Total Mortality in Cities for the Year 1910 — (Concluded)

	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS		
										Total births	Annual rate per 1,000 population	Still births
Third-class cities, under 10,000	*24*	*15*	*5*	*11*	*63*	*8*	.....	*15*	*28*	*681*	*19.2*	*25*
Oneonta	10	7	.....	3	27	3	.....	4	8	190	19.9	6
Port Jervis	7	4	4	5	16	3	.....	5	9	166	17.8	7
Oneida	4	2	.....	2	9	1	.....	2	8	157	18.9	5
Tonawanda	3	2	1	1	11	1	.....	4	3	168	20.2	7
TOTAL URBAN MORTALITY	*7,051*	*2,254*	*1,162*	*4,041*	*5,572*	*1,073*	*355*	*1,984*	*3,279*	*173,010*	*25.5*	*8,583*
TOTAL RURAL MORTALITY	*2,660*	*846*	*290*	*558*	*2,123*	*406*	*65*	*1,198*	*1,556*	*40,22[illegible]*	*17.4*	*1,369*

Record of each reporting local board of health, showing total deaths from all causes and from the principal zymotic diseases for 1910, by counties

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
ALBANY COUNTY	*3,228*	*4*	*44*		*51*	*37*	*11*	*34*	*140*	*344*	*46*	*189*	
ALBANY	1,943		15		9	24	9	17	56	239	29	135	
COHOES	509	3	19		32	3	1	13	54	49	4	14	
Berne	34				1				1	1		2	
Bethlehem	67					3		1	1	7	4	3	
Coeymans	55								3	5	1	2	
Colonie	119				1		1	1	8	4	2	9	
Guilderland	50		1							3	1	2	
Knox	14								1	1		1	
New Scotland	53		2			1			2	4	1	3	
Rensselaerville	24									2		3	
Westerlo	28								1			2	
WATERVLIET	261		7		2	6		2	11	21	3	8	
Green Island	71	1			6				2	8	1	5	
ALLEGANY COUNTY	*623*	*1*	*6*		*2*	*4*		*1*	*12*	*17*	*17*	*33*	*530*
Alfred	32										2	2	28
Allen	11												11
Alma	9				1				2				6
Almond	27								1			1	25
Amity	35		1							1	2	1	30
Andover	29									3	2		24
Angelica	38		1					1		1		5	30
Belfast	27				1				1	1			24
Birdsall	7												7
Bolivar	21								1	1		5	14
Burns	30					1							29
Caneadea	20		1								1	2	16
Centerville	9					1			1			1	6
Clarksville	8										1		7
Cuba	51		1								2	3	45
Friendship	51		1			1					3	2	44
Genesee	9												9
Granger	13					1						1	11
Grove	5												5
Hume	19								1	1		1	16
Independence	14										1		13
New Hudson	13	1								1			11
Rushford	18								1	2	1		14
Scio	20									1	1	4	14
Ward	3												3
Wellsville	12									2	1		9
Wellsville	65								3	2		4	56
West Almond	7									1			6
Willing	11		1										10
Wirt	9								1			1	7
BROOME COUNTY	*1,306*	*2*	*10*		*9*	*4*	*6*	*13*	*49*	*88*	*17*	*76*	*1,032*
BINGHAMTON	765	1	6		3	4	5	11	39	58	5	41	592
Barker	12										1	1	10
Binghamton	12										1		11
Chenango	15									2		1	12
Colesville	37		1						1	2	3	4	26
Conklin	18									1	1	2	14
Dickinson	53								1	5		2	45
Fenton	19				1			1			1	1	15
Kirkwood	12										1		11
Lestershire	63				1				2	4	1	4	51
Lisle	26									1		2	2
Maine	20										1	1	1
Nanticoke	7												
Sanford	64		1		1				2	4		8	4

Summary of Mortality in the Sanitary Districts for the Year 1910 — (Continued)

SANITARY DISTRICTS	Plumonary tuberculosis	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and enteritis (under 2 years)	Diarrhea and enteritis (over 2 years)
Maritime	9,265	1,483	4,093	826	2,663	3,682	11,246	6,002	7,585	6,194	810
Hudson Valley	1,205	155	689	134	400	1,466	1,601	853	720	501	175
Adirondack and Northern	552	82	314	60	250	757	803	411	341	258	98
Mohawk Valley	527	108	411	95	277	887	859	618	463	504	75
Southern Tier	331	74	418	83	257	910	918	450	333	221	107
East Central	500	80	395	81	269	832	969	486	366	309	94
West Central	255	53	325	61	183	692	705	278	245	164	76
Lake Ontario and Western	1,152	221	839	153	731	1,693	2,083	646	1,373	884	114
State institutions	272	22	38	5	27	485	308	123	236	1	98
Total for State	14,059	2,278	7,522	1,498	5,057	11,404	19,497	9,867	11,662	9,036	1,647
Urban mortality	11,235	1,853	5,447	1,093	3,785	6,233	14,542	7,481	9,502	7,665	1,035
Rural mortality	2,824	425	2,075	405	1,272	5,171	4,955	2,386	2,160	1,371	612

Summary of Mortality in the Sanitary Districts for the Year 1910 — (Concluded)

SANITARY DISTRICTS	Other diseases of the digestive system	Brights disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	Births: Total births	Births: Still births
Maritime	3,717	5,429	1,578	839	3,614	4,271	818	308	1,513	1,959		
Hudson Valley	685	914	329	94	268	798	113	31	253	501	.....	
Adirondack and Northern	370	378	133	73	111	306	61	8	232	335	.....	
Mohawk Valley	477	577	177	63	141	442	83	14	197	393	.....	
Southern Tier	453	539	178	74	103	392	85	10	217	316	.....	
East Central	440	507	150	58	98	381	86	11	181	307	.....	.....
West Central	255	339	126	38	71	250	61	7	201	187	.....	.....
Lake Ontario and Western	1,231	890	380	213	193	834	160	30	368	795	.....	.....
State institutions	63	138	40	.....	.....	21	12	1	20	42		
Total for State	7,691	9,711	3,100	1,452	4,599	7,695	1,479	420	3,182	4,835	213,235	9,952
Urban mortality	5,658	7,051	2,254	1,162	4,041	5,572	1,073	355	1,984	3,279	173,010	8,583
Rural mortality	2,033	2,660	846	290	558	2,123	406	65	1,198	1,556	40,225	1,369

Record of each reporting local board of health, showing total deaths from all causes and from the principal zymotic diseases for 1910, by counties

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
ALBANY COUNTY	*3,228*	*4*	*44*	....	*51*	*37*	*11*	*34*	*140*	*344*	*46*	*189*	....
ALBANY	1,943	....	15	....	9	24	9	17	56	239	29	135	....
COHOES	509	3	19	....	32	3	1	13	54	49	4	14	....
Berne	34	....	....	....	1	....	....	....	1	1	....	2	....
Bethlehem	67	....	....	....	....	3	....	1	1	7	4	3	....
Coeymans	55	....	....	....	....	....	....	....	3	5	1	2	....
Colonie	119	....	....	....	1	....	1	1	8	4	2	9	....
Guilderland	50	....	1	....	....	....	....	....	....	3	1	2	....
Knox	14	....	....	....	....	....	....	....	1	1	....	1	....
New Scotland	53	....	2	....	....	1	....	....	2	4	1	3	....
Rensselaerville	24	....	....	....	....	....	....	....	....	2	....	3	....
Westerlo	28	....	....	....	....	....	....	....	1	....	....	2	....
WATERVLIET	261	....	7	....	2	6	....	2	11	21	3	8	....
Green Island	71	1	....	....	6	....	....	....	2	8	1	5	....
ALLEGANY COUNTY	*623*	*1*	*6*	....	*2*	*4*	....	*1*	*12*	*17*	*17*	*33*	*530*
Alfred	32	....	....	....	....	....	....	....	....	....	2	2	28
Allen	11	....	....	....	....	....	....	....	....	....	....	....	11
Alma	9	....	....	....	1	....	....	....	2	....	....	....	6
Almond	27	....	....	....	....	....	....	....	1	....	....	1	25
Amity	35	....	1	....	....	....	....	....	....	1	2	1	30
Andover	29	....	....	....	....	....	....	....	....	3	2	....	24
Angelica	38	....	1	....	....	....	....	1	....	1	....	5	30
Belfast	27	....	....	....	1	....	....	....	1	1	....	....	24
Birdsall	7	....	....	....	....	....	....	....	....	....	....	....	7
Bolivar	21	....	....	....	....	....	....	....	1	1	....	5	14
Burns	30	....	....	....	....	1	....	....	....	....	....	....	29
Caneadea	20	....	1	....	....	....	....	....	....	....	1	2	16
Centerville	9	....	....	....	....	1	....	....	1	....	....	1	6
Clarksville	8	....	....	....	....	....	....	....	....	....	1	....	7
Cuba	51	....	1	....	....	....	....	....	....	....	2	3	45
Friendship	51	....	1	....	....	1	....	....	....	....	3	2	44
Genesee	9	....	....	....	....	....	....	....	....	....	....	....	9
Granger	13	....	....	....	....	1	....	....	....	....	....	1	11
Grove	5	....	....	....	....	....	....	....	....	....	....	....	5
Hume	19	....	....	....	....	....	....	....	1	1	....	1	16
Independence	14	....	....	....	....	....	....	....	....	....	1	....	13
New Hudson	13	1	....	....	....	....	....	....	....	1	....	....	11
Rushford	18	....	....	....	....	....	....	....	1	2	1	....	14
Scio	20	....	....	....	....	....	....	....	....	1	1	4	14
Ward	3	....	....	....	....	....	....	....	....	....	....	....	3
Wellsville	12	....	....	....	....	....	....	....	....	2	1	....	9
Wellsville	65	....	....	....	....	....	....	....	3	2	....	4	56
West Almond	7	....	....	....	....	....	....	....	....	1	....	....	6
Willing	11	....	1	....	....	....	....	....	....	....	....	....	10
Wirt	9	....	....	....	....	....	....	....	1	....	....	1	7
BROOME COUNTY	*1,306*	*2*	*10*	....	*9*	*4*	*6*	*13*	*49*	*88*	*17*	*76*	*1,032*
BINGHAMTON	765	1	6	....	3	4	5	11	39	58	5	41	592
Barker	12	....	....	....	....	....	....	....	....	....	1	1	10
Binghamton	12	....	....	....	....	....	....	....	....	....	1	....	11
Chenango	15	....	....	....	....	....	....	....	....	2	....	1	12
Colesville	37	....	1	....	....	....	....	....	1	2	3	4	26
Conklin	18	....	....	....	....	....	....	....	....	1	1	2	14
Dickinson	53	....	....	....	....	....	....	....	1	5	....	2	45
Fenton	19	....	....	....	1	....	....	1	....	....	1	1	15
Kirkwood	12	....	....	....	....	....	....	....	....	....	1	....	11
Lestershire	63	....	....	....	1	....	....	....	2	4	1	4	51
Lisle	26	....	....	....	....	....	....	....	....	1	....	2	2
Maine	20	....	....	....	....	....	....	....	....	....	1	1	1
Nanticoke	7	....	....	....	....	....	....	....	....	....	....	....	
Sanford	64	....	1	....	1	....	....	....	2	4	....	8	4

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
BROOME COUNTY—(*Continued*).													
Triangle	25						1	1		1		1	21
Union	94	1	1		2				4	5		3	78
Vestal	30		1		1					2		2	24
Windsor	34									3	2	3	26
CATTARAUGUS CO.	*904*	*3*	*7*	*1*	*5*	*7*	*1*	*9*	*32*	*39*	*19*	*68*	*713*
OLEAN	188	1				2		5	9	7		17	147
Allegany	47									6	3	3	35
Ashford	23		1					1			1	3	17
Carrollton	15	2								1			12
Cold Spring	9								1		1		7
Conewango	26								1		3	2	20
Dayton	18					1			1	1		2	13
East Otto	9											1	8
Elko	5		1						1				3
Ellicottville	27							1		2			24
Farmersville	11		1										10
Franklinville	41								2		1	3	35
Freedom	13											2	11
Great Valley	29				2	1		1				1	24
Hinsdale	20								1			1	18
Humphrey	9								2	1			6
Ischua	11								1			1	9
Leon	10											1	9
Little Valley	22								1		1	4	16
Lyndon	5											1	4
Machias	35								1	3		1	30
Mansfield	10									2	2		6
Napoli	11											1	10
New Albion	31					1				2	1	3	24
Olean	11									1	1	1	8
Otto	13					2					1	1	9
Perrysburg	12									1			11
Persia	22								1	3			18
Portville	27								2			2	23
Randolph	41		2						1	1		1	36
Red House	3												3
Salamanca	26				1					3		3	19
Salamanca	85		1		2			1	6	3	2	6	64
South Valley	7								1				6
Yorkshire	32		1	1			1			2	2	7	18
CAYUGA COUNTY	*996*	*1*	*18*	*1*	*6*	*3*	*1*	*7*	*47*	*68*	*15*	*69*	*760*
AUBURN	522		3		5	3	1	6	36	41	2	39	386
Aurelius	17									1		2	14
Brutus	46		2					1		1	2	1	39
Cato	16								3			1	12
Conquest	26		2									1	23
Fleming	10								1	1		1	7
Genoa	26	1							2		1	3	19
Ira	18		1							1			16
Ledyard	21				1				1		1	1	17
Locke	18		1							1	1		15
Mentz	26									6			20
Montezuma	11									1	2		8
Moravia	27		1							2		4	20
Niles	14											1	13
Owasco	9								1	1		1	6
Scipio	20									2			18
Sempronius	14												14
Sennett	32									6		4	22
Springport	26		6							1	1	2	16
Sterling	47		2						3	2	4	4	32

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
CAYUGA COUNTY—(*Continued*)													
Summer Hill	5												5
Throop	6										1		5
Venice	18											4	14
Victory	21			1						1			19
CHAUTAUQUA CO.	*1,539*	*4*	*15*		*34*	*11*	*7*	*21*	*63*	*66*	*36*	*88*	*1,194*
DUNKIRK	279		4		25	4		9	23	11	2	13	188
JAMESTOWN	404	1	9		4	1	1	5	8	23	4	21	327
Arkwright	7								2				5
Busti	38							1	1	3	2		31
Carroll	29								1	1	1	3	23
Charlotte	16										1	1	14
Chautauqua	83	1						1		5	1		75
Cherry Creek	14										2	2	10
Clymer	26					1					2	5	18
Dunkirk													
Ellery	21											1	20
Ellicott	56		1				4		2	3	1	4	41
Ellington	19									2		2	15
Fredonia	79		1		1	2			7	7	2	2	57
French Creek	10											1	9
Gerry	19	2						1			2	1	13
Hanover	98				2			1	9	4		9	73
Harmony	43						1		2	1	2	5	32
Kiantone	4												4
Mina	8										2		6
Poland	14										1	3	10
Pomfret	23								2			1	20
Portland	38								1	1	2		34
Ripley	28									1	1	1	25
Sheridan	24				1					1	1	3	18
Sherman	22										2		20
Stockton	37								1		4		32
Villenova	14								1	1		1	11
Westfield	22						1				1	2	18
Westfield	64				1	3		3	3	2		7	45
CHEMUNG COUNTY	*865*	*2*	*14*	*2*	*1*		*6*	*9*	*20*	*52*	*22*	*53*	*684*
ELMIRA	554	1	10	2	1		5	8	14	19	11	38	445
Ashland	8		1						1				6
Baldwin	10												10
Big Flats	19		1							2	1		15
Catlin	10												10
Chemung	27								1		4	2	20
Elmira	73	1	1				1		1	17	2	1	49
Erin	18										1	2	15
Horseheads	76							1	1	10	1	5	58
Southport	27		1							1	2	1	22
Van Etten	12											1	11
Veteran	31								2	3		3	23
CHENANGO COUNTY	*598*	*3*	*3*	*1*		*3*	*1*	*4*	*15*	*23*	*24*	*33*	*488*
Afton	30		1			1			1	1	1	2	23
Bainbridge	31					1	1		1	3	1	1	23
Columbus	14								1	1	1		11
Coventry	17									2			15
German	2											1	1
Greene	48									1	4	3	40
Guilford	39							1	1			2	35
Lincklaen	4											1	3
McDonough	17									1	1		15
New Berlin	41	1				1			1		1	3	34
North Norwich	13										3		10

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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CHENANGO COUNTY —(*Continued*)													
Norwich	11									2	1	1	7
Norwich	122	2		1				3	6	6	4	9	91
Otselic	17		1									2	14
Oxford	75		1						1	2	1	3	67
Pharsalia	9										1		8
Pitcher	12								2	1			9
Plymouth	9								1		1		7
Preston	17									2	1	2	12
Sherburne	41										2	2	37
Smithville	11									1	1		9
Smyrna	18											1	17
CLINTON COUNTY	*676*	*3*	*7*		*11*	*8*	*16*	*6*	*35*	*59*	*18*	*27*	*486*
Altona	21								2	3	3		13
Ausable	27								1	2	1	2	21
Beekmantown	40					2	3		1	4	1	1	28
Black Brook	23				1	1			3				18
Champlin	61	1	2		1			3	4	3	2	5	40
Chazy	36		1				1		1		4	2	27
Clinton	27								5		2	1	19
Dannemora	27									5			22
Ellenburgh	14	1								1			12
Mooers	61				7			2	5	4	2		41
Peru	28									3	1	1	23
Plattsburg	51						1	1	2	7		1	39
PLATTSBURG	195	1	3		2	4	8		7	23	2	9	136
Saranac	47		1				3		2	3		3	35
Schuyler Falls	18					1			2	1		2	12
COLUMBIA COUNTY	*768*	*1*	*12*	*1*			*3*	*3*	*33*	*62*	*17*	*41*	*595*
HUDSON	236	1	6				1	2	17	26		9	174
Ancram	18						1			1	2	1	13
Austerlitz	10										2		8
Canaan	14										1		13
Chatham	67		1							4	3	5	54
Claverack	70		1	1					3	4	1	4	56
Clermont	20									1			19
Copake	26								2		1	2	21
Gallatin	8									2		2	4
Germantown	22									1			21
Ghent	54		1						1	2	2	3	45
Greenport	15								1	2		1	11
Hillsdale	22									2	1	1	18
Kinderhook	63		2						2	6		7	46
Livingston	20								1	1	1	1	16
New Lebanon	20								2	2		1	15
Stockport	47							1	1	6	2	2	35
Stuyvesant	25								2	2		1	20
Taghkanic	11		1				1		1		1	1	6
CORTLAND COUNTY	*528*	*2*	*12*		*2*	*2*		*3*	*8*	*13*	*8*	*32*	*446*
Cincinnatus	15									1			14
Cortlandville	60								2	4	1	8	45
CORTLAND	219	1	9					2	4	3	2	14	184
Cuyler	16					1							15
Freetown	7											1	6
Harford	11											2	9
Homer	22		2							1		1	18
Homer	49	1	1			1		1		1	2	2	40
Lapeer	8									2	1		5
Marathon	23									1		2	20
Preble	11											1	10
Scott	15				2						2	1	10

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CORTLAND COUNTY —(*Continued*)													
Solon	11								1				10
Taylor	9												9
Truxton	18								1				17
Virgil	22												22
Willett	12												12
DELAWARE COUNTY	*725*	*2*	*17*		*3*	*12*	*11*	*4*	*15*	*27*	*21*	*46*	*567*
Andes	41		2			3	2			3	1	1	29
Bovina	11	1							2				8
Colchester	45		3		1	1		1			1	2	36
Davenport	26		1						1			2	21
Delhi	45					1				4	3	3	34
Deposit	9												9
Franklin	46		1			1			1	3		4	36
Hamden	20					1				1			18
Hancock	70				1			2	4		2	8	53
Harpersfield	17						1				1	1	14
Kortright	20									1	3	1	15
Masonville	13								1	1	1		10
Meredith	19											1	18
Middletown	76	1	1			1	4		3	2	1	4	59
Roxbury	35					4	2			2		2	25
Sidney	72		3					1	2	5	1	4	56
Stamford	46		4							1	2	5	34
Tompkins	26		1				2		1	1		2	19
Walton	88		1		1					3	5	5	73
DUTCHESS COUNTY	*1,432*	*4*	*13*	*2*	*5*	*3*	*9*	*13*	*59*	*120*	*13*	*79*	*1,112*
POUGHKEEPSIE	466	2	5			1	7	4	21	35	2	27	362
Amenia	30					1			1	1		1	26
Beekman	15									2			13
Clinton	20								1	2	1	1	15
Dover	37				4				2	1		1	29
East Fishkill	24								1	2		1	20
Fishkill	58							2	8	3	1	2	42
Fishkill Landing	67		1						1	6	1	3	55
Hyde Park	41						1			2	2	1	35
LaGrange	15								1			1	13
Matteawan	122								5	10	4	6	97
Milan	13		1									1	11
North East	44					1			2	1		4	36
Pawling	41								3	2		5	31
Pine Plains	24		1						1	1		1	20
Pleasant Valley	34						1		1	4		1	27
Poughkeepsie	68		1						2	16		4	45
Red Hook	52		2		1				1	4	1	4	39
Rhinebeck	65		2					2		4		2	55
Stanford	35	1							2	8	1	1	22
Unionvale	11									3		1	7
Wappinger	30			1				1	3	1		2	22
Wappinger Falls	51			1				4	2	7		5	32
Washington	69	1							1	5		4	58
ERIE COUNTY	*8,538*	*19*	*86*		*257*	*131*	*85*	*183*	*434*	*608*	*43*	*374*	*6,318*
BUFFALO	6,877	14	78		223	97	80	163	264	510	16	305	5,127
TONAWANDA	106		3				1	1	5	7	3	3	83
Alden	49								4	3		3	39
Amherst	65								5	4		7	49
Aurora	26							1				1	24
Boston	16							1	1	1		4	9
Brant	33				1			1	1	1	2		27
Cheektowaga	111		1		5		1	3	11	9		2	79
Clarence	37							1	3	1		3	29

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ERIE COUNTY—(*Continued*)													
Colden	14									1			13
Collins	35				1				1	6	2	5	20
Concord	53	1							1	2	5		44
Depew	85	3			8	3	2		16	3	2	1	47
East Aurora	41								2			6	33
East Hamburg	28				1					1		3	23
Eden	37		1			2			2	3			29
Elma	25									3		1	21
Evans	54					1			2	5	4	7	35
Grand Island	16												16
Hamburg	85		1			1		3	2	7	1	1	69
Holland	16		1							1	1	2	11
Lackawanna	397	1	1		14	23	1	7	98	18	1	3	230
Lancaster	32				2	1			1	2		1	25
Lancaster	67				1	2			6	5	1	4	48
Marilla	23											1	22
Newstead	56								2	8	4	3	39
North Collins	28							1		2		3	22
Sardinia	22					1			1		1		19
Tonawanda	27									1		2	24
Wales	14								1			2	11
West Seneca	63				1			1	5	4		1	51
ESSEX COUNTY	*543*	*3*	*6*			*3*	*5*	*12*	*25*	*57*	*18*	*23*	*391*
Chesterfield	37								1	3		3	30
Crown Point	36									6		3	27
Elizabethtown	19		1						1	1	3	1	12
Essex	25									1	3	2	19
Jay	36	1	1			2				2	1	2	27
Keene	13					1			1	3			8
Lake Placid	13								3	3			7
Lewis	17									1	1	1	14
Minerva	11							1			1		9
Moriah	138		3				2	9	15	10	3	1	95
Newcomb	2									1		1	
North Elba	27	1					2		1	9			14
North Hudson	8												8
St. Armand	10									3			7
Schroon	15									1		1	13
Ticonderoga	63		1				1		2	9	2	2	46
Westport	30							1		2		1	26
Willsboro	25								1	2	4	3	15
Wilmington	18	1						1				2	14
FRANKLIN COUNTY	*825*	*1*	*10*			*17*	*18*	*11*	*38*	*174*	*20*	*32*	*502*
Altamont	21							1	3	2		2	13
Bangor	30		2			1		2	2	2	1		20
Belmont	27											3	24
Bombay	36						2		4	6	1	1	22
Brandon	9		1			1			1				6
Brighton	16								1	5			10
Burke	23		2				1			3		3	14
Chateaugay	48								4	1	1	2	40
Constable	32						1			5	3		23
Dickinson	25						2	2		1	1	1	18
Duane	3												3
Fort Covington	32	1					2		1	3		1	24
Franklin	22							1	1	6		1	13
Harriettstown	13							1	1	4			7
Malone	108		2			2	1		5	16	6	4	72
Malone	75		3			5	3		6	7	4	6	41
Moira	43					4	2	1	2	1	1	1	31
Santa Clara	2												2

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FRANKLIN COUNTY—(*Continued*)													
Saranac Lake	150					2	3	1	2	99		4	39
Tupper Lake	50					2	1	2	4	10	1	1	29
Waverly	39								1	2		2	34
Westville	19									1	1		17
FULTON COUNTY	*672*		*4*		*1*	*4*	*1*	*3*	*26*	*40*	*14*	*42*	*537*
GLOVERSVILLE	321		2		1	4		3	14	16	6	15	260
Bleecker	6												6
Broadalbin	29								2	3	2	4	18
Caroga	11									2			9
Ephratah	29									1		2	26
JOHNSTOWN	143		1						7	11	3	13	108
Johnstown	39								2	5		2	30
Mayfield	34								1	1	1	2	29
Northampton	25		1							1		1	22
Oppenheim	15						1					2	12
Perth	7												7
Stratford	13										2	1	10
GENESEE COUNTY	*589*	*1*	*8*	*2*		*5*		*3*	*24*	*26*	*13*	*35*	*472*
Alabama	31								2	3	2	2	22
Alexander	28								1	2		1	24
Batavia	206	1	4	2		3		2	9	7	3	17	158
Batavia	30							1	1	2	1	2	23
Bergen	35									1		3	31
Bethany	30		1							2			27
Byron	20												20
Darien	19		1						1		1		16
Elba	11								2			1	8
Le Roy	47		1			1			2	4	2	3	34
Le Roy	24								2			1	21
Oakfield	17								1				16
Pavilion	25								1	3		1	20
Pembroke	44					1			2	1	2	1	37
Stafford	22		1							1	2	3	15
GREENE COUNTY	*528*		*10*			*3*	*2*		*15*	*61*	*6*	*31*	*400*
Ashland	8		1							1		1	5
Athens	41								1	4		1	35
Cairo	41								1	5		4	31
Catskill	68		2						5	10		3	48
Catskill	96		3						1	15		5	72
Coxsackie	72								4	6	1	4	57
Durham	32		2							3		3	24
Greenville	26		2			1				2	3	2	16
Halcott	4					1							3
Hunter	46						1		1	7			37
Jewett	7												7
Lexington	11						1			1		1	8
New Baltimore	33								1	2		1	29
Prattsville	14					1				2		2	9
Windham	29								1	3	2	4	19
HAMILTON COUNTY	*56*		*3*						*3*	*6*	*1*	*2*	*41*
Arietta	4								1	1			2
Benson	1												1
Hope	3												3
Indian Lake	8								1			1	6
Inlet	5									1			4
Lake Pleasant	11									2			9
Long Lake	10		3						1				6
Morehouse	0												0
Wells	14									2	1	1	10

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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HERKIMER COUNTY	*866*	*1*	*2*	....	*4*	*3*	*7*	*5*	*33*	*54*	*15*	*40*	*702*
Columbia	26	....	....	....	....	....	1	....	1	1	2	3	18
Danube	8	....	....	....	....	....	....	....	....	....	....	1	7
Fairfield	13	....	....	....	....	....	....	....	....	....	....	....	13
Frankfort	25	....	....	....	....	....	....	....	1	2	1	1	20
Frankfort	56	....	....	....	....	1	....	1	7	3	1	1	42
German Flats	55	....	....	....	....	....	....	....	1	2	....	6	46
Herkimer	121	....	....	....	....	2	1	1	3	5	....	7	102
Herkimer	35	....	....	....	....	....	....	....	....	6	1	....	28
Ilion	90	1	1	....	1	....	1	....	1	4	....	3	78
Litchfield	11	....	....	....	....	....	....	....	....	....	....	2	9
LITTLE FALLS	194	....	1	....	3	....	2	....	11	10	3	5	159
Little Falls	8	....	....	....	....	....	....	1	....	....	....	....	7
Manheim	21	....	....	....	....	....	....	....	1	3	....	....	17
Newport	21	....	....	....	....	....	....	1	1	1	1	....	17
Norway	10	....	....	....	....	....	....	....	1	....	1	....	8
Ohio	4	....	....	....	....	....	....	....	....	1	....	....	3
Russia	42	....	....	....	....	....	....	....	2	2	2	3	33
Salisbury	27	....	....	....	....	....	....	....	1	4	2	1	19
Schuyler	10	....	....	....	....	....	1	....	1	1	....	....	7
Stark	19	....	....	....	....	....	1	....	....	....	1	1	16
Warren	17	....	....	....	....	....	....	....	1	2	....	2	12
Webb	18	....	....	....	....	....	....	....	....	6	....	1	11
Wilmurt	6	....	....	....	....	....	....	....	....	1	....	....	5
Winfield	29	....	....	....	....	....	....	1	....	....	....	3	25
JEFFERSON COUNTY	*1,353*	*2*	*39*	*1*	*1*	*33*	....	*5*	*43*	*69*	*23*	*73*	*1,064*
WATERTOWN	468	1	24	....	....	15	....	3	20	21	4	23	357
Adams	73	....	....	....	....	1	....	....	2	4	1	6	59
Alexandria	67	....	1	....	....	7	....	....	2	5	....	5	47
Antwerp	40	....	1	....	....	....	....	....	1	3	1	1	33
Brownville	51	....	1	....	....	....	....	....	....	2	1	....	47
Cape Vincent	36	....	....	....	....	3	....	....	....	4	....	1	28
Carthage	57	....	2	....	....	....	....	....	4	3	1	1	46
Champion	36	....	....	....	....	1	....	....	2	1	2	3	27
Clayton	59	....	2	1	....	....	....	....	....	5	3	4	44
Ellisburg	73	....	....	....	....	....	....	....	....	2	4	2	65
Henderson	22	....	....	....	....	....	....	....	2	4	....	1	15
Hounsfield	36	....	....	....	....	....	....	....	....	2	3	3	28
Le Roy	44	....	1	....	....	3	....	....	1	1	....	1	37
Lorraine	18	....	....	....	....	1	....	....	1	1	....	1	14
Lyme	30	....	....	....	....	....	....	....	1	2	1	1	25
Orleans	32	....	2	....	....	1	....	....	3	1	....	3	22
Pamelia	25	....	....	....	....	....	....	....	1	2	....	....	22
Philadelphia	35	....	....	....	....	....	....	....	....	1	....	....	34
Rodman	18	....	....	....	....	....	....	1	1	....	....	3	13
Rutland	32	....	1	....	....	1	....	1	1	2	....	3	23
Theresa	39	....	1	....	1	....	....	....	1	1	1	8	26
Watertown	11	....	....	....	....	....	....	....	....	....	1	....	10
Wilna	46	....	3	....	....	....	....	....	....	2	....	3	38
Worth	5	1	....	....	....	....	....	....	....	....	....	....	4
LEWIS COUNTY	*374*	....	*2*	....	....	....	....	*1*	*10*	*27*	*14*	*26*	*294*
Croghan	32	....	....	....	....	....	....	....	1	1	2	1	27
Denmark	43	....	....	....	....	....	....	....	....	6	1	2	34
Diana	38	....	....	....	....	....	....	....	....	7	3	1	27
Greig	8	....	....	....	....	....	....	....	....	1	....	1	6
Harrisburg	9	....	....	....	....	....	....	....	1	....	....	....	8
High Market	5	....	....	....	....	....	....	....	....	....	....	1	4
Lewis	12	....	....	....	....	....	....	....	1	....	....	2	9
Leyden	32	....	....	....	....	....	....	1	....	1	2	3	25
Lowville	68	....	1	....	....	....	....	....	3	5	....	5	54
Lyonsdale	13	....	....	....	....	....	....	....	2	....	....	1	10
Martinsburg	26	....	1	....	....	....	....	....	....	1	....	5	19
Montague	6	....	....	....	....	....	....	....	....	....	....	....	6

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
LEWIS COUNTY— (*Continued*)													
New Bremen	16									1		2	13
Osceola	3												3
Pinckney	8									2	1		5
Turin	10									2			8
Watson	22								1			2	19
West Turin	23								1		5		17
LIVINGSTON COUNTY	*520*	*1*	*5*		*5*	*4*	*2*	*1*	*23*	*20*	*9*	*29*	*481*
Avon	51								1		3	2	45
Caledonia	39				1		1		2	1	2	1	31
Conesus	13									1		3	9
Geneseo	42		1						1	5		2	33
Groveland	12												12
Leicester	17									1		2	14
Lima	32									1		3	28
Livonia	30		2						1			2	25
Mt. Morris	13								1			2	10
Mt. Morris	58		1			4			8	3	1		41
North Dansville	11												11
Dansville	74	1	1				1		4	4		4	59
Nunda	42								1		1	2	38
Ossian	7								1			1	5
Portage	8										1	1	6
Sparta	7									1			6
Springwater	16										1		15
West Sparta	9				1			1				1	6
York	39				3				3	3		3	27
MADISON COUNTY	*619*	*1*	*5*		*1*	*2*	*5*	*1*	*20*	*24*	*17*	*40*	*503*
Brookfield	35								1	1	1	3	29
Canastota	62					2			3	3	2	5	47
Cazenovia	65									2	1	4	58
De Ruyter	25								1	1	1	3	19
Eaton	54									2	1	2	49
Fenner	8											1	7
Georgetown	17									1	1	3	12
Hamilton	61								4	1	2	5	49
Lebanon	15									1	1		13
Lenox	22								2	2		2	16
Lincoln	10												10
ONEIDA	118		4				5		5	8	4	9	88
Madison	32							1	2	1	1	1	26
Nelson	16									3		1	12
Smithfield	10	1	1		1								7
Stockbridge	20											1	19
Sullivan	49								2	3	2		42
MONROE COUNTY	*3,932*	*9*	*39*	*1*	*54*	*15*	*18*	*42*	*276*	*319*	*29*	*265*	*2,865*
ROCHESTER	3,084	9	30	1	47	15	10	34	203	277	17	213	2,228
Brighton	42				1			1	5	8		3	24
Chili	15										1	1	13
Clarkson	23		1								1	3	18
Fairport	48						1		2	2		2	41
Gates	52		1						3	3	1	8	41
Greece	127				1			1	42	5		5	73
Hamlin	18						1	1	1			3	12
Henrietta	28								2			3	23
Irondequoit	40						2		2	8	2		26
Mendon	44		3		1				1	3		5	31
Ogden	49								3		1	1	44
Parma	35				1					1		2	31
Penfield	27							1	1	2		1	22
Perinton	52		1		2		1		3	2	2	2	39

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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MONROE COUNTY—(*Continued*)													
Pittsford	48	.....	.....	.....	.....	.....	2	1	2	2	.....	3	38
Riga	26	.....	1	.....	.....	.....	.....	1	1	1	.....	3	19
Rush	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	18
Sweden	21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	20
BROCKPORT	50	.....	1	.....	.....	.....	.....	.....	1	2	1	4	41
Webster	51	.....	1	.....	1	.....	.....	1	3	2	2	3	38
Wheatland	32	.....	.....	.....	.....	.....	1	1	1	1	.....	3	25
MONTGOMERY CO.	*994*	*1*	*10*	.....	*5*	*2*	*10*	*14*	*101*	*60*	*7*	*37*	*747*
AMSTERDAM	540	1	7	.....	4	1	8	12	89	32	2	15	369
Amsterdam	54	.....	1	.....	1	.....	.....	1	4	5	.....	3	39
Canajoharie	59	.....	.....	.....	.....	1	1	.....	2	3	2	3	47
Charlestown	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	8
Florida	17	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	15
Glen	45	.....	.....	.....	.....	.....	.....	.....	1	1	.....	3	40
Minden	34	.....	.....	.....	.....	.....	.....	.....	1	1	.....	2	30
Fort Plain	61	.....	2	.....	.....	.....	.....	.....	2	3	.....	3	51
Mohawk	46	.....	.....	.....	.....	.....	.....	1	.....	4	1	3	37
Palatine	52	.....	.....	.....	.....	.....	1	.....	.....	5	1	.....	45
Root	27	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	24
St. Johnsville	49	.....	.....	.....	.....	.....	.....	.....	1	4	1	1	42
NASSAU COUNTY	*1,133*	*2*	*6*	*2*	*9*	*2*	*6*	*14*	*92*	*70*	*9*	*62*	*859*
Hempstead	457	1	2	1	7	.....	2	5	34	32	3	27	343
North Hempstead	278	.....	3	1	2	.....	2	4	29	7	1	10	219
Oyster Bay	311	1	.....	.....	.....	2	2	4	20	23	4	17	238
Rockville Center	41	.....	.....	.....	.....	.....	.....	1	3	2	1	2	32
Freeport	46	.....	1	.....	.....	.....	.....	.....	6	6	.....	6	27
NEW YORK, CITY OF	*76,750*	*294*	*558*	*26*	*952*	*774*	*294*	*1,715*	*5,655*	*8,690*	*366*	*3,709*	*53,717*
Bor. of Manhattan	38,668	177	269	7	448	271	154	898	2,904	3,976	162	1,915	27,487
Bor. of Bronx	6,968	29	41	3	75	45	23	136	316	1,779	26	323	4,172
Bor. of Brooklyn	25,676	72	198	13	384	422	92	558	1,996	2,429	144	1,212	18,156
Bor. of Queens	3,971	12	39	3	33	30	21	104	335	358	24	185	2,827
Bor. of Richmond	1,467	4	11	.....	12	6	4	19	104	148	10	74	1,075
NIAGARA COUNTY	*1,404*	*5*	*41*	.....	*16*	*19*	*12*	*22*	*85*	*85*	*14*	*58*	*1,047*
LOCKPORT	299	1	2	.....	3	3	.....	4	11	25	1	12	237
NIAGARA FALLS	551	2	30	.....	5	14	9	10	45	32	6	14	384
Cambria	15	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	12
Hartland	28	.....	.....	.....	1	.....	.....	.....	.....	.....	1	1	25
Lewiston	41	2	.....	.....	.....	.....	1	.....	1	3	.....	3	31
Lockport	62	.....	.....	.....	1	.....	.....	.....	1	3	.....	3	54
Newfane	42	.....	.....	.....	.....	.....	.....	.....	1	3	.....	2	36
Niagara	16	.....	1	.....	.....	.....	1	.....	1	1	.....	.....	12
Pendleton	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	11
Porter	30	.....	1	.....	2	.....	.....	.....	.....	1	.....	3	23
Royalton	70	.....	1	.....	.....	.....	1	1	2	2	5	3	55
Somerset	34	.....	.....	.....	1	.....	.....	.....	1	3	.....	3	26
Wheatfield	15	.....	1	.....	.....	.....	.....	.....	1	1	.....	1	11
N. TONAWANDA	160	.....	5	.....	3	2	.....	7	21	8	1	6	107
Wilson	26	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	23
ONEIDA COUNTY	*2,536*	*6*	*15*	*1*	*1*	*15*	*19*	*30*	*162*	*187*	*35*	*141*	*1,924*
UTICA	1,297	5	5	.....	.....	11	14	14	100	94	18	65	971
ROME	411	.....	4	.....	.....	3	2	10	27	26	7	23	309
Annsville	17	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	15
Augusta	24	.....	.....	.....	.....	.....	.....	.....	1	3	1	1	18
Ava	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	7
Boonville	57	.....	.....	.....	.....	.....	.....	.....	1	3	.....	6	47
Bridgewater	16	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	1	12
Camden	52	.....	.....	.....	.....	1	.....	.....	3	8	1	3	36
Deerfield	15	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	12

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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ONEIDA COUNTY—(*Continued*)													
Florence	15		1						1	1		1	11
Floyd	10									1	1	1	7
Forestport	19	1			1					2		3	12
Kirkland	56							2	1	4		3	46
Lee	19											2	17
Marcy	13											1	12
Marshall	25									2		1	22
New Hartford	91							1	6	7		6	71
Paris	37			1					2	3	1	1	29
Remsen	28						1			5		1	21
Rome													
Sangerfield	16										2	2	12
Steuben	13								3	1		1	8
Trenton	25								1	2	1	2	19
Vernon	38		1							3		3	31
Verona	44		1						1	4		2	36
Vienna	28									1		5	22
Western	22									2			20
Westmoreland	33		1							4		2	26
Whitestown	107		2				1		15	9	3	2	75
ONONDAGA COUNTY	*3,058*	*6*	*53*		*26*	*12*	*7*	*36*	*198*	*189*	*31*	*173*	*2,327*
SYRACUSE	2,124	5	38		22	9	4	25	166	123	15	125	1,592
Camillus	36								3	2		1	30
Cicero	29		1								4		24
Clay	29	1	1							1		4	22
De Witt	48						1			2	1	4	40
East Syracuse	47		2				1		3	2		2	37
Elbridge	49				1			1		3	1	1	42
Fabius	26									1	3	2	20
Geddes	10								1	1			8
La Fayette	13									1		1	11
Lysander	46		3		2				1	2	2	3	33
Baldwinsville	52					1			1	2		2	46
Manlius	87		1		1	1			2	5	2	7	68
Marcellus	27								1	1	2	2	21
Onondaga	141		1					1	4	25	1	6	103
Otisco	18											2	16
Pompey	33		2						1	1		1	28
Salina	45					1			1	2		3	38
Skaneateles	53		2							3		1	47
Solvay	77		1				1	8	11	8		3	45
Spafford	11		1						1				9
Tully	24							1	1			2	20
Van Buren	33								1	4		1	27
ONTARIO COUNTY	*781*	*1*	*9*		*3*	*1*	*3*	*2*	*22*	*36*	*16*	*65*	*623*
Bristol	16		1							1		1	13
Canadice	11								1	1	1	1	7
Canandaigua	16		1					1	1	1	2	1	9
Canandaigua	157		2		1				4	4	1	22	123
East Bloomfield	25								1	1			23
Farmington	23					1			1			2	19
Geneva	7									2			5
Geneva	175	1	3		2				4	13	2	11	139
Gorham	17		1						1	2			13
Hopewell	30									1	1	1	27
Manchester	116		1				2		2	5	7	11	88
Naples	17											1	16
Phelps	54								3	1	1	5	44
Richmond	17									1			16
Seneca	33									1		3	29

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ONTARIO COUNTY—(*Continued*)													
South Bristol	9						1		1	1		1	5
Victor	38							1	2	1	1		33
West Bloomfield	20								1			5	14
ORANGE COUNTY	*2,003*	*7*	*27*	*1*	*16*	*13*	*14*	*22*	*86*	*167*	*22*	*98*	*1,530*
NEWBURGH	510	4	12		3	5	4	5	25	50	5	25	372
MIDDLETOWN	275	1	4		3			2	1	27	1	16	220
Blooming Grove	26							1				3	22
Chester	32				1	2			2	4			23
Cornwall	93				1			2	7	7	2	2	72
Crawford	27		1						1	1	1	1	22
Deerpark	35									4	2		29
Port Jervis	170		6		1			1	5	11	1	10	135
Goshen	124	1	2		1		2		2	11		9	96
Greenville	8								1			1	6
Hamptonburgh	22									2		1	19
Highlands	62							5	3	1	1	3	49
Minisink	25							1	1	2	1	1	19
Monroe	50				1		2	1	3	4	1	2	36
Montgomery	47								2	1		5	39
Mount Hope	37								2	10	1		24
Newburgh	75				1				6	5		4	59
New Windsor	51				1			1	4	2		1	42
Tuxedo	60					2			5	5		2	46
Wallkill	40	1			1			1	1	3		1	32
Warwick	121				1	4	4	1	6	9	2	6	88
Wawayanda	25						2		1		2	3	17
Woodbury	39				1			1	5	3			29
Walden	49		2	1					3	5	2	2	34
ORLEANS COUNTY	*496*		*3*		*2*		*3*	*2*	*17*	*35*	*11*	*34*	*389*
Albion	85		2				1	1	5	9		6	61
Albion	35									6	1	2	26
Barre	25		1							1	1	4	18
Carlton	37								3	2	1	1	30
Clarendon	25				1					4	1	2	17
Gaines	27						1			3	1	4	18
Holley	11									2			9
Kendall	19								1	1		1	16
Murray	52								2	3	4	3	40
Ridgeway	23									1	1	1	20
Medina	101				1		1		5	1		8	85
Shelby	28							1	1	1		1	24
Yates	28									1	1	1	25
OSWEGO COUNTY	*1,127*	*1*	*18*		*1*	*1*	*11*	*6*	*41*	*62*	*19*	*63*	*905*
OSWEGO	385		12				5	1	18	17		20	312
Albion	24								3	2	1	1	17
Amboy	11									1			10
Boylston	10								2				8
Constantia	27								1	1		1	24
Granby	22		1							1	2	2	16
Hannibal	30								1	2		1	26
Hastings	41						1			4	1	1	34
Mexico	73									7	3	9	54
New Haven	19									2	1	2	14
Orwell	7												7
Oswego	46		1		1		1		1	2			40
Palermo	18		1								2	1	14
Parish	25		1						1	2		1	20
Redfield	9						1	1	1		1		5
Richland	60						1			2		3	54
Sandy Creek	39						1		3			4	31

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OSWEGO COUNTY— (*Continued*)													
Schroeppel	43									1		6	36
Scriba	23								3	1		1	18
Volney	37		1							3	1	2	30
FULTON	155		1			1	1	3	7	13	6	7	116
West Monroe	12	1											11
Williamstown	11									1	1	1	8
OTSEGO COUNTY	*846*		*4*		*1*	*1*	*1*	*2*	*22*	*81*	*27*	*51*	*706*
Burlington	11									1		1	9
Butternuts	36										1	1	34
Cherry Valley	28										2	2	24
Decatur	6										2		4
Edmeston	22									1	2	2	17
Exeter	18										2	1	15
Hartwick	24							2	1	2	1	1	17
Laurens	23		1							1			21
Maryland	31								2	3		1	25
Middlefield	51									5	2	4	40
Milford	32									2			30
Morris	22									1		3	18
New Lisbon	12								2			3	7
Oneonta	12		1									2	9
ONEONTA	181		2		1				9	6		13	150
Otego	32								1	1	1	1	28
Otsego	27								1		2	2	22
Cooperstown	58									3	4	4	47
Pittsfield	10												10
Plainfield	12									1	1		10
Richfield	45								1	1	1	2	40
Roseboom	20									1			19
Springfield	29					1	1			1	2	3	21
Unadilla	47								2		1	3	41
Westford	8												8
Worcester	49								3	1	3	2	40
PUTNAM COUNTY	*267*			*2*	*1*	*2*		*1*	*11*	*18*	*6*	*18*	*208*
Carmel	46								2	2	2	5	35
Kent	18									4		1	13
Patterson	16					1			2	3			10
Philipstown	66			1					2	3	2	1	57
Putnam Valley	15				1	1							13
South East	56							1	2	2	2	8	41
Cold Spring	50			1					3	4		3	39
RENSSELAER CO	*2,282*	*11*	*26*	*1*	*22*	*16*	*12*	*18*	*82*	*228*	*42*	*124*	*1,700*
TROY	1,597	9	15		17	15	4	13	67	175	24	83	1,175
Berlin	23									3	1	3	16
Brunswick	32							1	1	2		1	27
East Greenbush	27								1		1	4	21
Grafton	13											1	12
RENSSELAER	159		3	1	1	1	7	1	2	15	3	14	110
Hoosick	35							1			3	1	30
Hoosick Falls	87	1			1			1	3	11		5	65
Nassau	36								1	4	1	5	25
North Greenbush	15	1								2		1	11
Petersburg	13												13
Pittstown	38		1						1	3		1	32
Poestenkill	16		2		1				2	1		1	9
Sand Lake	27		1						1		1		24
Schaghticoke	72		1					1	2	4	3	3	58
Schodack	69		3		2				1	7	2		54
Stephentown	24						1			1	3	1	18

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
ROCKLAND COUNTY	*668*	*3*	*4*	*4*	*3*	*4*	*4*	*4*	*37*	*63*	*7*	*34*	*501*
Clarkstown	99		1		1		1	2	5	9	2	5	73
Haverstraw	97			4					6	13		8	71
Orangetown	133					3			7	9	3	8	103
Nyack	97				2		2		2	5	2	9	75
Ramapo	122	1	1			1	1	1	9	16		6	86
Spring Valley	21	2							1	2			16
Stony Point	52		2					1	4	4		1	40
Suffern	47								3	5		2	37
ST. LAWRENCE CO.	*1,332*	*9*	*18*		*2*	*17*	*6*	*9*	*61*	*66*	*37*	*65*	*1,042*
OGDENSBURG	268	2	6		1			4	16	17	1	14	207
Brasher	29								1		1		27
Canton	104		1				1		3	4	4	4	87
Clare	7								2			1	4
Clifton	24		1			1			2			1	19
Colton	26								1		4	1	20
De Kalb	26		1							1	5	3	16
De Peyster	14									1		3	10
Edwards	25	1			1	2		1	2			1	17
Fine	24		1			1	2		2	1			17
Fowler	15								1	1			13
Gouverneur	95	2	1			3		1	6	6	4	5	67
Hammond	23								1	4	2	4	12
Hermon	25							1	2	1	2	1	18
Hopkinton	23								1		1		21
Lawrence	23									1		1	21
Lisbon	29											6	23
Louisville	22	1									2		19
Macomb	14		1						2	1	1		9
Madrid	24		1						1	1	1		20
Massena	15						1						14
Massena	50					5		1	1				43
Morristown	40	1								1	1	3	34
Norfolk	39		1			1			4	1		1	31
Oswegatchie	43	1						1	3	2		1	35
Parishville	23					2			1	1		2	17
Piercefield	16					1	1		4				10
Pierrepont	20									3		1	16
Pitcairn	12		1							1		2	8
Potsdam	61		2				1			6	5	4	43
Potsdam	78		1			1			3	6	1	4	62
Rossie	15									2			13
Russell	21	1							2				18
Stockholm	36									3	1	2	30
Waddington	23									1	1		21
SARATOGA COUNTY	*1,076*	*4*	*18*		*14*	*12*	*4*	*7*	*48*	*74*	*25*	*66*	*809*
Ballston Spa	74		2				2		8	5	3	4	50
Ballston	31									1	1	3	26
Charlton	11											1	10
Clifton Park	40					1				3	1	2	33
Corinth	46		3						1	3	3	1	35
Day	8								1			2	5
Edinburgh	12											1	11
Galway	22									1	1	3	17
Greenfield	32								6	3		2	21
Hadley	6										1		5
Halfmoon	31		1		1					2	1	2	24
Malta	24				1				1	1		1	20
Mechanicville	117	3	2			7		1	7	6	1	4	86
Milton	41								2	1	1	2	35
Moreau	39							1	2	2		2	32
Northumberland	18										1		17
Providence	9								1				8

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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SARATOGA COUNTY— (*Continued*)													
Saratoga	54						1		1	3	3	6	40
Saratoga Springs	13									2	1	1	9
Saratoga Springs	255		2		2	4	1	2	10	22	5	22	185
Stillwater	66	1			6				2	6	1	4	46
Waterford	109		2		4			3	5	13	1	8	78
Wilton	18		1						1				16
SCHENECTADY CO.	*1,249*	*4*	*5*		*3*	*14*	*10*	*18*	*131*	*84*	*6*	*52*	*922*
SCHENECTADY	1,070	3	5		3	11	10	15	115	72	4	41	791
Duanesburg	25					1				1		3	20
Glenville	49					1			2	2	1	2	41
Niskayuna	30							1	2	6		2	19
Princetown	6											1	5
Rotterdam	69	1				1		2	12	3	1	3	46
SCHOHARIE COUNTY	*394*		*2*	*1*	*2*	*6*	*6*	*2*	*5*	*21*	*9*	*25*	*315*
Blenheim	12									2		2	8
Broome	17									2		1	14
Carlisle	13									1			12
Cobleskill	57		1		1		1			4		5	45
Conesville	8					3	1		1	1	1		1
Esperance	17									1	1	1	14
Fulton	29					1	2		1	1	1	2	21
Gilboa	25									1		2	22
Jefferson	18		1						1		1		15
Middleburg	43						1	1		2	1	8	35
Richmondville	26					2			1		1	2	20
Schoharie	47								1	2	1	1	42
Seward	19						1			1		2	15
Sharon	30			1						1		2	26
Summit	14										2		12
Wright	19				1			1		2		2	13
SCHUYLER COUNTY	*215*		*1*				*2*		*4*	*9*	*9*	*13*	*177*
Catherine	19										1	1	17
Cayuta	8									1		1	6
Dix	63						2		1	4	2	4	50
Hector	59								2	2	3	2	50
Montour	20								1	2		3	14
Orange	14										1		13
Reading	16												16
Tyrone	16		1								2	2	11
SENECA COUNTY	*372*		*1*	*1*	*2*	*1*	*1*	*1*	*8*	*21*	*9*	*25*	*302*
Covert	27							1		1	2	2	21
Fayette	26		1									1	24
Junius	19								1			2	16
Lodi	22								1	1		5	15
Ovid	29								1	2		2	24
Romulus	29								1	2	1		25
Seneca Falls	10												10
Seneca Falls	114			1	2		1		3	10	3	6	88
Tyre	5												5
Varick	19					1			1				17
Waterloo	20									1			19
Waterloo	52									4	3	7	38
STEUBEN COUNTY	*1,198*	*3*	*18*		*6*	*3*	*5*		*25*	*43*	*22*	*71*	*1,002*
CORNING	200		8		1		1		4	7	1	6	172
HORNELL	174	1	5		1	3			4	5	5	9	141
Addison	56		1				1			2		2	50
Avoca	40								2	5	2	4	27

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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STEUBEN COUNTY— (*Continued*)													
Bath	67	1								2		7	57
Bath	67		1						1	6		5	54
Bradford	15									2			13
Cameron	15				1								14
Campbell	21								1				20
Canisteo	43						1		2	1	1	4	34
Caton	13								1	1			11
Cohocton	33									1			32
Corning	41	1	1							3		3	33
Dansville	9											1	8
Erwin	30								2	1		3	24
Fremont	12												12
Greenwood	16											4	12
Hartsville	9								3			1	5
Hornby	8											1	7
Hornellsville	31								1	1		5	24
Howard	27									1	3	2	21
Jasper	18										2	1	15
Lindley	24		1				1					1	21
Prattsburg	19									2		2	15
Pulteney	10									1			9
Rathbone	12						1					1	10
Thurston	15												15
Troupsburg	25		1						1		4	3	16
Tuscarora	9												9
Urbana	35										1	1	33
Wayland	43								1	1		3	38
Wayne	12										1	2	9
West Union	16				3						1		12
Wheeler	13												13
Woodhull	20								2	1	1		16
SUFFOLK COUNTY	*1,303*	*1*	*12*	*1*	*10*	*12*	*13*	*10*	*60*	*88*	*29*	*78*	*989*
Amityville	67		1					2	1	4		7	52
Babylon	72								1	7		1	63
Babylon	41	1					2			3	1	3	31
Brookhaven	202		1			4	2	1	7	22	5	12	148
East Hampton	56		1				2	1			8	4	40
Newport	48		4		1	2			1	3		1	36
Huntington	166		1	1		2	1	1	8	8	5	7	132
Islip	191		3		3				6	12	2	10	155
Patchogue	50				4	1			1	2	1	11	30
Riverhead	77						1	2	6	2		4	62
Shelter Island	9								1	1			7
Smithtown	58							3	7	2	1		45
Southampton	136					2	3		13	10	1	11	96
Sag Harbor	53					1	1		2	3	4	1	41
Southold	77		1		2		1		6	9	1	6	51
SULLIVAN COUNTY	*673*		*9*		*7*		*2*	*2*	*28*	*182*	*18*	*12*	*413*
Bethel	32		1						2	1	1		27
Callicoon	31								4	2	1	1	23
Cochecton	15				1				1	1	1		11
Delaware	23								1	1	1		20
Fallsburgh	63		1		4				2	17		2	37
Forestburgh	5									1			4
Fremont	27								2	2			23
Highland	26									3	1		22
Liberty	200		4				1	1	4	111	5	2	72
Lumberland	11								1	1	1		8
Mamakating	42		1							8	1		32
Neversink	31				1			1	2	2	1	3	21

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SULLIVAN COUNTY— (*Continued*)													
Rockland	50						1		5	5	4	1	34
Thompson	101		2		1				3	24	1	3	67
Tusten	16								1	3			12
TIOGA COUNTY	*395*	*1*	*2*		*1*			*1*	*11*	*14*	*9*	*19*	*337*
Waverly	83								3	5	4	4	67
Barton	25									1	1	1	22
Berkshire	12											1	11
Candor	43	1							1			2	39
Newark Valley	27								1		1	3	22
Nichols	19								2	1	1		15
Owego	66		2		1				1		1	1	60
Owego	54								2	4		3	45
Richford	12								1	1		1	9
Spencer	23							1		2	1	3	16
Tioga	31												31
TOMPKINS COUNTY	*548*		*6*	*1*	*3*		*1*		*9*	*29*	*17*	*47*	*435*
ITHACA	244		5	1	2				6	15	6	16	193
Caroline	28											5	23
Danby	19						1			2	1	4	11
Dryden	56									2	1	7	46
Enfield	12									1		1	10
Groton	60								1	3	6	6	44
Ithaca	17				1				1			1	14
Lansing	32									1		5	26
Newfield	27									1	1		25
Ulysses	53		1						1	4	2	2	43
ULSTER COUNTY	*1,459*	*11*	*17*	*3*	*3*	*5*	*7*	*24*	*37*	*129*	*37*	*69*	*1,117*
Kingston	475	3	5		2	2	2	7	12	46	14	21	361
Denning	6							1					5
Esopus	58	1						3		7		2	45
Gardiner	47			1				1	3	1		2	39
Hardenburg	4												4
Hurley	30									4	2	2	22
Kingston	7											1	6
Lloyd	38	1							1		1	1	34
Marbletown	57					1			3	1	1	3	48
Marlborough	62		2					1		8		7	44
New Paltz	62		3	1				1		6	5	2	44
Olive	56	2				1		2	2	2		6	41
Plattekill	23								1	3		1	18
Rochester	33	1						2	3	2		3	22
Rosendale	56	1	1				1		1	5	1	1	45
Saugerties	94	2	1					1	2	15		5	68
Saugerties	63		2						3	10	2	3	43
Shandaken	48					1	1		1	1	1	3	40
Shawangunk	33						1		1	2	1	1	27
Ulster	39			1	1		1	1	1	2	1		31
Wawarsing	81		1				1	2	1	10	5	2	59
Ellenville	47		2						1	4	2	1	37
Woodstock	40							2	1		1	2	34
WARREN COUNTY	*456*	*1*	*5*	*2*	*2*		*1*	*1*	*7*	*33*	*9*	*25*	*370*
Bolton	18										1		17
Caldwell	23		1							3		1	18
Chester	28		1					1		2		1	23
Hague	10									1	1		8
Horicon	8									1		1	6
Johnsburg	28									2	2	2	22
Luzerne	13		1							2		2	8
Queensbury	35				1					1		1	32
Glens Falls	241	1	2	2	1		1		7	18	4	12	193

Record of each reporting local board of health, showing total deaths, etc.— (Continued)

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WARREN COUNTY—(*Continued*)													
Stony Creek	13									1	1		11
Thurman	3											1	2
Warrensburg	36									2		4	30
WASHINGTON CO.	*796*		*6*		*2*	*1*	*5*	*1*	*30*	*52*	*25*	*36*	*658*
Argyle	47								1	6	3	2	35
Cambridge	47		1							1		2	43
Dresden	7									1			6
Easton	27		1		2				1			2	21
Fort Ann	36						2			4	2	1	27
Fort Edward	100						1		2	2	3	3	89
Hudson Falls	74								5	4	4	4	57
Granville	87		1						6	9	4	5	62
Greenwich	89						1		1	3	5	6	73
Hampton	14		1							1			12
Hartford	30								1	2			27
Hebron	17					1			1	1	1	1	12
Jackson	9								1	1			7
Kingsbury	25									3	1		21
Putnam	9									1		1	7
Salem	44						1			2		2	39
White Creek	30		1					1	2	3		2	21
Whitehall	8										1	2	5
Whitehall	96		1						9	8	1	3	74
WAYNE COUNTY	*767*	*2*	*7*		*1*	*2*	*4*	*1*	*26*	*32*	*21*	*35*	*636*
Newark	85					1	2		1	6	5	3	67
Arcadia	31								2		1	1	27
Butler	30		2						1	2		1	24
Galen	24								1		1	1	21
Clyde	38							1		1		5	31
Huron	17	1										1	15
Lyons	30									1	2		27
Macedon	35								2	1		2	30
Marion	32								3	1		1	27
Ontario	36								2	3	1	1	29
Palmyra	71		1						2	4	2	3	59
Rose	35									3	1	1	30
Savannah	22								1	1		2	18
Sodus	65				1				3	3	4	3	51
Walworth	32								1	1		2	28
Williamson	46					1			2	1			42
Wolcott	63	1	3						1	1	3	2	52
Lyons	75		1				2		4	3	1	6	58
WESTCHESTER CO.	*4,378*	*3*	*38*	*4*	*38*	*29*	*39*	*65*	*383*	*401*	*29*	*244*	*3,105*
YONKERS	1,266	1	15	1	18		8	28	180	120	5	59	831
MOUNT VERNON	433		3		2	1	4	6	36	34	4	20	323
Bedford	69				1		1	1	3	18	1	5	39
Cortlandt	110		1	1	1	1	4		5	8	3	2	84
Dobbs Ferry	72								4	4	1	3	60
Peekskill	280		4	1	2	9	3		14	23	2	13	209
East Chester	91		1		3			1	6	4	2	2	72
Greenburgh	79					1		1	7	6		6	58
Harrison	59								4	5	1	2	47
Hastings-on-Hudson	57				5		1	2	14	8		1	26
Irvington	24									2		1	21
Lewisboro	20												20
Mamaroneck	89							1	9	9		5	65
Mount Pleasant	264		2				1		4	59		50	148
New Castle	58		1						5	4		2	46
New Rochelle	342		1			6	8	8	23	24	1	23	248
North Castle	33							2	2	2		1	26

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WESTCHESTER CO.— (*Continued*)													
North Salem	22									1		1	20
North Tarrytown	79	1			2			1	6	9		3	57
Ossining	17									3		1	13
Ossining	167		2			6		3	6	15	1	7	127
Pelham	26						2	1			1	4	18
Poundridge	15								1				14
Port Chester	209	1	2			4	5	6	27	9	2	8	145
Rye	49								3	2	1		43
Scarsdale	10											1	9
Somers	17				1				1	4		1	10
Tarrytown	84		1		1	1	1	1	3	6	1	8	61
White Plains	5												5
White Plains	281		5	1	1		1	3	18	16	1	15	220
Yorktown	51				1				2	6	2		40
WYOMING COUNTY	*468*		*10*		*1*	*4*		*2*	*16*	*13*	*8*	*23*	*391*
Arcade	38		1						2	2		4	29
Attica	32		1					1				3	27
Bennington	22					2						2	18
Castile	42		2						4	2	3	2	29
Covington	12		1					1	1				9
Eagle	14										1	1	12
Gainesville	31				1				1	1		2	26
Genesee Falls	9												9
Java	23									2			21
Middlebury	29					1			1			1	26
Orangeville	28								1	1	1	1	24
Perry	58		1						2	3	2	2	48
Perry	22									1			21
Pike	17								1			2	14
Sheldon	27		1								1		25
Warsaw	51		3						1			2	45
Wethersfield	13					1			2	1		1	8
YATES COUNTY	*280*	*1*	*5*		*1*				*7*	*15*	*8*	*13*	*230*
Barrington	18								1	2	1		14
Benton	25								2			2	21
Italy	11								1			1	9
Jerusalem	41		1						1	2		1	36
Middlesex	19								1			1	17
Milo	24		1							1	1	3	18
Penn Yan	70		2		1				1	5	4	3	54
Potter	21									1	1		19
Starkey	41	1								3	1	1	35
Torrey	10		1							1		1	7
State prisons	60									14		2	
State Hospitals for Insane	1,934	1	14		6	1				245	6	33	
Other public institutions	378	2	2						1	68	1	11	

Deaths by Causes 1885 *to Date*

YEAR	All deaths	Death rate	Deaths under five years of age	EPIDEMIC DISEASES		
				Cerebro-spinal menin-gitis	Typhoid fever	Malarial diseases
1885	80,407	14.3	30,027	446	1,067	944
1886	86,801	15.2	32,928	572	1,169	899
1887	108,269	18.6	35,114	540	1,327	935
1888	114,584	19.3	38,345	490	1,483	813
1889	113,155	18.6	40,243	402	1,550	746
1890	128,648	20.8	37,392	474	1,612	738
1891	129,850	20.5	42,740	589	1,926	619
1892	131,388	20.3	42,434	649	1,664	613
1893	129,659	19.7	41,643	875	1,685	493
1894	123,423	18.6	41,472	489	1,640	422
1895	128,834	19.1	42,002	546	1,716	409
1896	126,253	18.4	40,136	510	1,542	449
1897	118,525	17.1	35,771	538	1,351	380
1898	122,584	17.4	37,113	695	1,810	404
1899	121,831	17.0	35,386	702	1,604	248
1900	132,352	18.2	39,204	531	1,948	309
1901	131,461	17.7	35,775	492	1,741	283
1902	124,657	16.4	31,215	456	1,318	189
1903	127,602	16.4	32,768	454	1,665	137
1904	142,014	17.8	39,086	1,708	1,652	149
1905	137,222	17.0	38,045	2,566	1,554	106
1906	140,773	17.1	39,292	1,178	1,568	139
1907	147,890	17.6	40,168	230	1,673	136
1908	138,912	16.3	37,941	539	1,375	84
1909	140,261	16.1	38,278	485	1,315	78
1910	147,629	16.1	39,690	452	1,374	65

Deaths by Causes 1885 *to Date* — (Continued)

YEAR	EPIDEMIC DISEASES — (*Continued*)						
	Small-pox	Scarlet fever	Measles	Erysip-elas	Whoop-ing cough	Croup and diph-theria	Diar-rhea (under 2 years)
1885	33	1,184	1,170	354	834	4,508	7,301
1886	39	1,011	895	357	1,244	5,597	7,028
1887	175	1,267	1,205	327	447	6,490	9,258
1888	212	2,452	944	342	994	6,448	8,774
1889	30	2,205	899	293	1,303	5,855	8,294
1890	4	913	1,161	312	1,156	4,915	8,468
1891	4	2,252	1,200	367	825	5,072	9,179
1892	143	2,177	1,350	477	921	5,918	9,185
1893	252	1,626	789	366	1,203	5,947	9,056
1894	308	1,227	900	331	1,020	6,592	8,956
1895	11	850	1,266	370	1,169	4,989	9,055
1896	3	759	1,495	340	996	4,597	8,776
1897	27	841	873	303	825	4,115	7,267
1898	1	837	838	237	1,155	2,612	8,499
1899	21	730	756	353	886	2,786	6,480
1900	14	689	1,333	466	1,020	3,306	7,959
1901	445	1,430	859	363	721	3,026	9,337
1902	442	1,215	929	314	923	2,859	8,315
1903	41	1,057	721	354	811	3,035	7,480
1904	13	1,194	1,170	430	426	3,041	8,329
1905	9	726	988	415	847	2,296	8,955
1906	7	690	1,369	452	821	2,691	8,578
1907	10	1,032	997	483	789	2,603	9,213
1908	3	1,688	1,175	419	503	2,473	9,111
1909	4	1,205	1,272	472	783	2,313	7,873
1910	7	1,617	1,285	526	727	2,433	9,036

Deaths by Causes 1885 *to Date* — (Continued)

YEAR	Other Causes of Death				
	Consumption	Acute respiratory diseases	Puerperal	Digestive	Urinary
1885	11,238	10,864	974	4,343	4,069
1886	11,947	11,389	884	5,066	4,305
1887	11,609	11,557	885	5,599	4,582
1888	12,383	13,756	1,069	6,146	4,926
1889	12,390	13,833	979	6,501	5,732
1890	13,831	18,053	928	7,696	5,688
1891	13,445	20,647	1,053	8,486	6,473
1892	13,471	20,432	1,131	8,920	6,502
1893	13,123	19,807	1,054	8,834	6,955
1894	12,824	15,885	911	8,745	6,946
1895	13,267	17,725	939	8,892	7,449
1896	13,265	16,820	972	8,955	7,770
1897	12,641	16,277	1,013	8,963	7,866
1898	12,979	16,350	920	10,101	8,641
1899	13,412	17,938	877	10,163	9,064
1900	13,590	19,232	1,136	10,644	9,501
1901	13,766	17,589	1,068	7,478	9,558
1902	12,582	16,986	1,034	7,235	9,604
1903	13,194	17,339	1,110	7,282	9,998
1904	14,159	21,132	1,272	7,866	10,815
1905	14,061	17,832	1,377	8,158	10,697
1906	14,027	20,178	1,326	8,741	11,344
1907	14,431	22,663	1,413	9,035	12,163
1908	14,347	18,477	1,335	8,398	11,329
1909	13,996	20,829	1,333	8,791	12,196
1910	14,059	21,529	1,452	9,338	12,811

Deaths by Causes 1885 *to Date* — (Concluded)

YEAR	Other Causes of Death — (*Concluded*)					
	Circulatory	Nervous	Cancer	Violence	Old age	Unclassified
1885	4,069	8,651	1,887	2,994	4,889	7,728
1886	5,238	8,799	2,050	3,296	5,990	8,981
1887	5,737	9,957	2,363	3,780	8,676	9,736
1888	6,394	11,174	2,497	3,842	7,994	11,310
1889	6,886	11,266	2,638	3,834	5,980	12,615
1890	7,306	11,593	2,868	4,542	5,484	18,728
1891	8,480	13,166	3,028	5,028	6,530	15,371
1892	9,013	14,009	3,152	5,543	6,385	14,647
1893	9,042	13,826	3,232	5,295	5,826	14,622
1894	8,451	12,948	3,305	5,487	5,497	15,310
1895	9,966	11,724	3,554	5,889	5,569	16,380
1896	10,486	11,925	3,789	7,022	5,377	14,835
1897	10,905	12,124	4,131	6,172	5,516	14,950
1898	10,511	13,312	4,385	6,520	5,524	14,641
1899	10,606	13,177	4,533	6,093	6,068	15,324
1900	10,676	12,993	4,871	6,714	5,402	16,134
1901	11,949	13,366	5,033	7,926	5,439	17,388
1902	12,889	12,964	4,990	7,058	4,949	15,833
1903	13,561	12,966	5,456	7,646	4,765	17,466
1904	14,309	14,142	5,697	8,822	5,120	19,858
1905	14,547	13,569	6,056	8,352	4,923	19,025
1906	15,395	13,521	6,168	8,874	4,332	18,944
1907	16,952	14,539	6,420	9,668	2,723	20,717
1908	17,233	11,989	6,554	9,183	2,516	20,181
1909	18,784	11,191	7,060	9,232	2,189	18,860
1910	19,497	11,404	7,522	9,846	1,951	20,698

Infant Mortality

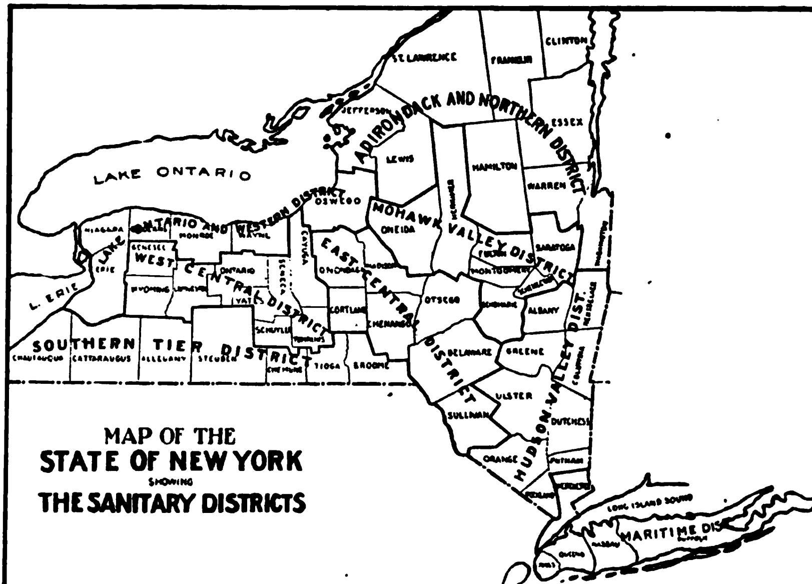
The following table shows the mortality among children under five and infants under one year of age, and also relation to total deaths at all ages and in their relation to the total births.

	Total mortality	Mortality under five years	Under one year*	Total births	Annual number of deaths under one year to 1,000 living births	Percentage under one year to total deaths	Percentage of deaths under five years to total deaths
1885	80,407	30,027	....	63,536	....	....	37.3
1886	86,801	32,928	....	89,828	....	....	37.9
1887	108,269	35,114	....	102,038	....	....	32.4
1888	114,584	38,345	....	103,089	....	....	33.5
1889	113,155	40,243	....	114,804	....	....	35.5
1890	128,648	37,392	....	112,572	....	....	29.1
1891	129,850	42,740	....	125,909	....	....	32.9
1892	131,388	42,434	....	130,143	....	....	32.3
1893	129,659	41,643	....	136,297	....	....	32.1
1894	123,433	41,472	....	141,827	....	....	33.6
1895	128,834	42,002	....	142,311	....	....	32.6
1896	126,253	40,136	....	147,327	....	....	31.7
1897	118,525	35,771	....	144,631	....	....	30.1
1898	122,584	37,113	....	138,702	....	....	30.2
1899	121,831	35,386	....	136,778	....	....	29.0
1900	132,089	39,204	....	143,156	....	....	29.6
1901	131,335	35,775	....	140,539	....	....	27.2
1902	124,830	31,215	....	146,740	....	....	25.0
1903	127,498	32,768	....	158,343	....	....	25.7
1904	142,217	†14,177	24,909	165,014	151.0	17.5	27.5
1905	137,435	12,218	25,827	172,259	150.0	18.8	27.7
1906	141,099	12,176	27,114	183,012	148.1	19.2	27.9
1907	147,130	12,157	28,011	196,020	142.9	19.0	27.3
1908	138,912	11,380	26,561	203,159	130.7	19.1	27.3
1909	140,261	12,201	26,077	202,656	128.6	18.6	27.3
1910	147,629	12,233	27,457	222,074	128.7	18.6	27.0

* Until 1904, deaths under one year were not classified separately.
† Mortality one to five years.

Mortality under one year

1910	Rural	4,736	1909	Rural	4,592
	Urban	22,721		Urban	21,485



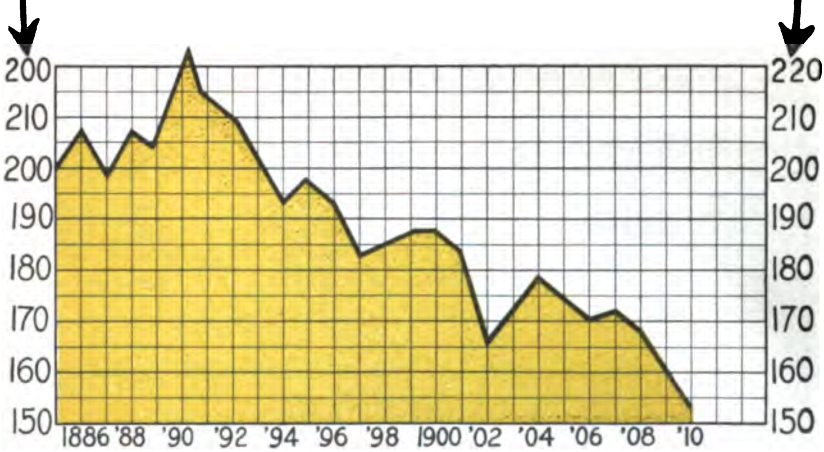
Population of the Sanitary Districts

DISTRICTS	1890	1900	1905	1907	1908	1909	1910
Maritime	2,743,959	3,753,614	4,393,861	4,686,262	4,776,624	4,881,466	5,266,032
Hudson Valley	679,647	690,000	703,893	710,579	711,302	729,735	727,719
Adirondack and Northern	378,577	394,772	408,116	413,178	415,502	419,564	405,855
Mohawk Valley	368,503	408,974	444,741	460,528	466,495	466,973	488,414
Southern Tier	401,864	428,543	438,936	442,574	446,042	449,936	455,504
East Central	382,954	401,082	414,209	419,076	421,941	425,973	431,778
West Central	314,876	315,945	315,677	314,433	317,252	320,101	320,243
Lake Ontario and Western	727,473	876,206	947,875	978,703	991,198	1,005,895	1,062,783
Entire State	5,997,853	7,269,136	8,067,308	8,425,333	8,546,356	8,699,643	9,158,328

Relative Area, Density of Population and Death Rates in the Sanitary Districts for 1910

DISTRICTS	Area in square miles (land)	Population per square mile	Urban death rate	Rural death rate	Total death rate	PERCENTAGE OF DEATHS: Under 1 year	Between 1 and 5 years	At 60 years and over	From epidemic diseases
Maritime	1,946	2,706	15.9	14.6	15.8	20.9	10.3	22.7	6.8
Hudson Valley	5,679	128	19.0	16.0	17.5	14.6	5.5	40.0	6.4
Adirondack and Northern	13,358	30	17.0	15.6	15.8	15.7	5.7	44.2	7.6
Mohawk Valley	5,179	94	16.4	15.4	16.0	18.5	6.4	40.0	5.5
Southern Tier	6,419	71	14.5	15.5	15.1	13.0	4.4	48.8	6.1
East Central	6,252	69	15.7	16.6	16.3	13.6	4.0	46.9	6.2
West Central	4,588	69	15.5	14.9	15.0	11.5	3.1	55.3	5.4
Lake Ontario and Western	4,199	253	15.7	14.3	15.3	19.4	7.9	33.9	8.0
Entire State	47,620	192	16.1	16.3	16.1	18.6	8.3	31.0	6.7

MORTALITY
FROM
PULMONARY TUBERCULOSIS.
DEATHS PER 100,000 POPULATION
SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

Mortality from Pulmonary Tuberculosis

The following table shows the total deaths in the State, annual death rate per 1,000 population; reported mortality from tuberculosis, and deaths per 100,000 population, due to tuberculosis since 1885; also percentage of deaths due to tuberculosis.

YEAR	Population	Total deaths	Death rate	Deaths from tuberculosis	Deaths per 100,000 population	Percentage of all deaths due to tuberculosis
1885	5,609,910	80,407	14.3	11,238	200.3	14.0
1886	5,719,855	86,801	15.2	11,947	208.8	13.7
1887	5,831,947	108,269	18.6	11,609	199.0	10.7
1888	5,946,246	114,584	19.3	12,383	208.2	10.8
1889	6,062,764	113,155	18.6	12,390	204.3	10.9
1890	6,182,600	128,648	20.8	13,417	217.0	10.8
1891	6,316,333	129,850	20.5	13,445	212.8	10.4
1892	6,438,283	131,388	20.3	13,441	209.2	10.3
1893	6,537,716	129,659	19.7	13,123	200.7	10.2
1894	6,638,696	123,423	18.6	12,824	193.1	10.5
1895	6,741,246	128,834	19.1	13,267	196.7	10.5
1896	6,845,375	126,253	18.4	13,265	193.7	10.7
1897	6,951,111	118,525	17.1	12,641	181.8	10.8
1898	7,058,459	122,584	17.4	12,979	183.8	10.7
1899	7,167,491	121,831	17.0	13,412	187.1	11.0
1900	7,281,533	132,352	18.2	13,591	186.6	10.6
1901	7,434,896	131,461	17.7	13,766	185.1	10.6
1902	7,591,491	124,657	16.4	12,582	165.7	10.2
1903	7,751,375	127,602	16.4	13,194	170.2	10.4
1904	7,914,636	142,014	17.8	14,158	178.8	10.0
1905	8,081,333	137,222	17.0	14,059	174.0	10.3
1906	8,251,538	140,773	17.1	14,027	170.0	10.0
1907	8,425,333	147,890	17.5	14,406	171.0	9.8
1908	8,546,356	138,912	16.3	14,316	167.5	10.3
1909	8,699,643	140,261	16.1	13,996	161.0	10.0
1910	9,158,328	147,629	16.1	14,059	153.5	9.5

Reported Mortality from Pulmonary Tuberculosis in the Sanitary Districts for past 10 years

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	8,730	8,080	8,582	9,124	9,096	9,540	9,590	9,517	9,252	9,265
Hudson Valley	1,342	1,180	1,259	1,346	1,286	1,126	1,235	1,226	1,181	1,205
Adirondack and Northern	564	521	493	552	583	550	549	571	556	552
Mohawk Valley	608	517	570	579	588	523	604	612	585	527
Southern Tier	441	431	378	459	431	395	400	419	362	331
East Central	563	482	479	567	576	491	526	525	512	500
West Central	363	341	355	357	352	315	357	340	335	255
Lake Ontario and Western	1,155	1,030	1,078	1,175	1,152	1,086	1,145	1,137	1,213	1,152
Entire State	13,766	12,582	13,194	14,159	14,064	14,026	*14,431	14,347	13,996	†14,059

* Includes twenty-five delayed returns not classified by district in which they occurred.
† Includes 272 deaths in State Institutions.

The following table gives the number of deaths per 100,000 *population from Pulmonary Tuberculosis in the Sanitary Districts in the State during the past* 10 *years*

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	224.9	201.5	207.4	213.8	207.0	210.8	204.6	204.6	189.6	175.9
Hudson Valley	193.7	169.9	180.2	189.1	182.6	159.7	173.8	172.1	161.8	165.5
Adirondack and Northern	141.9	130.2	122.4	136.1	142.8	134.0	132.9	136.7	132.5	136.0
Mohawk Valley	146.1	122.1	132.4	132.3	132.2	115.7	131.1	132.7	125.3	107.0
Southern Tier	102.4	99.6	86.9	105.0	98.1	89.0	90.3	93.7	80.4	72.7
East Central	139.4	118.6	117.1	137.7	139.0	118.1	125.5	124.7	120.2	115.8
West Central	114.9	107.9	121.4	113.1	111.5	99.1	113.6	105.7	104.6	79.6
Lake Ontario and Western	129.6	113.8	117.2	125.8	121.5	113.3	117.1	116.3	120.5	108.4
Entire State	185.1	165.7	170.2	178.8	174.0	170.0	171.0	167.5	161.0	153.5

In each 1,000 *Deaths there were from Tuberculosis in the* —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	115	110	117	110	113	115	111	119	114	111
Hudson Valley	113	107	100	108	104	93	95	100	96	95
Adirondack and Northern	110	105	92	96	97	89	87	95	89	86
Mohawk Valley	93	85	90	85	87	73	79	81	82	67
Southern Tier	75	75	65	69	67	61	57	60	52	48
East Central	96	90	80	87	90	77	78	76	77	71
West Central	80	77	75	71	70	64	68	70	69	53
Lake Ontario and Western	90	85	80	85	82	74	73	77	80	71
Entire State	106	102	104	100	103	100	98	103	100	95

The following table shows the mortality from Pulmonary Tuberculosis in the cities of the State grouped in order of population

CITIES	1901–1905		1906		1907	
	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis
First-class cities, over 175,000:						
City of New York	215.8	11.6	218.2	11.8	212.0	11.4
Buffalo	132.0	8.7	129.9	7.7	128.5	8.1
Rochester	138.2	9.5	135.2	8.8	126.5	8.1
Second-class cities, 50,000 to 175,000:						
Syracuse	135.2	9.4	116.2	7.5	122.3	7.7
Albany	228.0	12.6	206.1	11.5	177.0	9.8
Yonkers	188.2	11.6	160.9	9.4	126.9	8.0
Troy	276.5	13.6	270.6	13.4	275.8	13.2
Utica	174.7	9.6	130.8	6.9	186.3	9.7
Schenectady	141.7	9.3	116.3	7.9	117.4	7.9
Third-class cities, 20,000 to 50,000:						
Binghamton	139.0	8.1	121.3	8.1	100.5	6.5
Elmira	134.0	8.7	131.7	9.1	128.9	8.2
Auburn	143.3	9.1	158.1	9.5	124.6	7.7
Amsterdam	149.5	9.5	129.2	7.4	104.0	6.2
Jamestown	93.0	9.0	82.7	8.0	70.4	6.1
Mount Vernon	115.1	8.1	101.6	6.5	113.2	7.5
Niagara Falls	99.8	6.2	71.9	4.6	89.7	4.9
New Rochelle	94.9	7.0	116.3	7.3	66.1	4.4
Poughkeepsie	174.2	8.8	136.0	7.7	112.0	5.5
Newburgh	261.4	11.9	192.5	9.7	240.7	12.3
Watertown	95.6	6.4	88.8	5.0	126.4	6.7
Kingston	209.0	11.0	184.3	9.9	185.3	10.0
Cohoes	220.8	11.3	233.3	11.9	254.2	12.0
Oswego	150.0	9.4	177.3	10.3	118.9	7.5
Gloversville	107.9	7.8	107.5	7.2	63.8	3.9
Rome	171.7	10.0	73.4	4.3	186.4	9.7
Third-class cities, 10,000 to 20,000:						
Lockport	135.8	8.7	91.4	6.6	122.9	8.0
Dunkirk	81.4	5.1	100.6	6.3	119.8	7.5
Ogdensburg	331.7	12.5	141.9	7.8	135.1	7.6
Middletown	202.5	10.0	106.9	7.1	157.2	10.4
Glens Falls	149.5	9.5	147.3	8.4	117.4	7.9
Watervliet	177.6	10.6	172.4	10.1	176.9	10.2
Ithaca	129.7	8.4	68.0	4.7	126.7	7.7
Olean	54.9	4.8	70.0	5.0	90.0	6.5
Lackawanna	......	......	......	......	......	......
Corning	119.7	8.2	79.1	5.9	71.4	3.7
Hornell	116.3	8.0	123.1	8.5	100.0	7.1
Geneva	83.7	5.9	104.0	6.4	124.0	8.9
Little Falls	105.3	9.2	127.3	9.2	154.5	9.4
North Tonawanda	92.6	7.6	60.0	4.3	76.2	5.8
Cortland	73.6	6.0	87.0	6.6	91.7	7.1
Hudson	184.3	9.7	133.3	6.9	200.0	10.6
Plattsburg	171.0	11.3	60.0	4.6	120.4	9.4
Rensselaer	148.6	8.6	93.4	6.2	100.0	7.0
Fulton	121.3	8.3	11.4	0.73	77.8	6.0
Johnstown	104.9	7.9	135.4	10.9	122.5	8.1
Third class cities, under 10,000:						
Oneonta	91 0	5.9	97.1	6.1	59.4	3.0
Port Jervis	173.4	10.0	92.8	5.1	111.1	6.3
Oneida	126.2	8.9	71.4	4.6	126.4	8.6
Tonawanda	117.1	8.7	113.9	10.8	87.5	6.4

Mortality from Pulmonary Tuberculosis —(Concluded)

CITIES	1908		1909		1910	
	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis
First-class cities, over 175,000:						
City of New York	204.4	12.1	194.2	11.7	181.1	11.2
Buffalo	134.3	8.7	131.8	8.6	119.8	7.4
Rochester	133.6	9.5	143.3	9.7	126.1	9.0
Second-class cities, 50,000 to 175,000:						
Syracuse	124.6	7.6	115.6	7.5	89.1	5.8
Albany	210.0	11.4	168.7	9.6	238.1	12.3
Yonkers	166.9	10.9	148.2	9.5	148.9	9.8
Troy	237.7	11.9	239.5	12.5	227.8	11.0
Utica	177.9	9.4	159.8	9.7	125.5	7.2
Schenectady	92.3	7.0	117.7	10.2	98.0	6.7
Third-class cities, 20,000 to 50,000:						
Binghamton	110.7	6.7	78.5	5.1	119.2	7.6
Elmira	92.3	6.1	97.3	6.2	51.0	3.4
Auburn	141.9	10.0	99.2	6.8	118.0	7.9
Amsterdam	124.5	7.5	150.3	9.0	101.3	5.9
Jamestown	82.5	7.4	63.2	5.3	73.0	5.7
Mount Vernon	129.0	9.0	104.0	7.4	109.1	7.9
Niagara Falls	84.9	5.8	106.2	7.3	104.5	5.8
New Rochelle	100.9	7.3	92.2	7.1	82.1	7.0
Poughkeepsie	158.8	8.5	130.5	6.8	124.8	7.1
Newburgh	132.6	8.2	156.8	9.1	179.4	9.8
Watertown	80.2	5.4	106.6	7.0	78.3	4.5
Kingston	142.7	8.4	237.4	11.9	177.4	9.7
Cohoes	202.9	11.4	244.0	12.1	198.0	9.6
Oswego	102.3	6.1	97.6	6.5	72.6	4.4
Gloversville	128.2	7.0	117.2	7.3	77.2	5.0
Rome	178.2	9.2	111.0	5.5	126.0	6.3
Third-class cities, 10,000 to 20,000:						
Lockport	150.5	10.8	127.3	8.3	138.9	8.4
Dunkirk	80.7	5.8	55.3	5.0	63.4	3.9
Ogdensburg	94.0	5.6	114.0	7.0	106.4	6.3
Middletown	152.6	9.4	120.4	7.8	176.5	9.8
Glens Falls	101.8	7.7	147.4	10.6	117.9	7.5
Watervliet	178.4	10.3	198.5	12.6	139.1	8.0
Ithaca	104.5	6.4	83.4	6.1	101.2	6.1
Olean	86.1	6.5	50.0	4.3	47.2	3.7
Lackawanna	......	......	......	......	123.7	4.5
Corning	107.6	6.9	78.0	5.5	50.9	3.5
Hornell	72.0	4.8	95.0	6.5	36.7	2.9
Geneva	83.4	7.3	110.7	8.9	104.4	7.4
Little Falls	140.0	11.8	155.6	9.9	81.1	5.2
North Tonawanda	102.1	7.2	72.9	4.9	66.5	5.0
Cortland	73.8	5.1	47.8	3.7	26.0	1.4
Hudson	165.7	10.8	126.9	8.1	226.8	11.0
Plattsburg	90.0	7.8	139.7	8.1	207.7	11.8
Rensselaer	108.2	8.7	90.0	7.0	140.0	9.5
Fulton	97.9	6.0	68.0	4.8	123.2	8.4
Johnstown	73.3	5.7	105.5	6.4	105.0	7.7
Third-class cities, under 10,000:						
Oneonta	58.1	3.2	125.0	7.2	62.8	3.3
Port Jervis	141.7	8.3	80.4	4.4	118.2	6.5
Oneida	114.0	7.5	49.5	3.6	36.1	2.5
Tonawanda	62.5	4.9	123.0	8.6	84.3	6.6

A study of the above table shows that there is a pretty uniform lessening of the number of deaths in cities from pulmonary tu-

berculosis, and also of the percentage of the total deaths represented by the mortality from consumption. In some cities, notably Syracuse, Utica, Schenectady, Cohoes, Watertown, Dunkirk, Watervliet, Little Falls, Hornell and Cortland, the reduction is marked.

The table following shows the deaths from pulmonary tuberculosis in Greater New York and in the rest of the State. The mortality is shown month by month for the series of years from 1890 to 1910 inclusive.

It will be seen that the lowest annual mortality from pulmonary tuberculosis occurred in 1902, when the total for the State was 12,582. In 1903 it increased to 13,194, and to 14,158 in 1904. It remained in the 14,000 mark until 1908, the highest figure, 14,406, being reached in 1907. In considering these figures it must be borne in mind that they are the records of years during which increasing attention has been called to the ravages of tuberculosis, and it is fair to assume that the returns have been increasingly accurate and complete from year to year. In 1909 the mortality for the whole State dropped to 13,996, and the figures just compiled for 1910 show an increase to 14,059, or only 63 more deaths from this cause in 1910 than in 1909.

In 1910 there were 154 deaths from consumption per 100,000 population as against 205 deaths per 100,000 population in 1890. For a period of 25 years 11 per cent. of the deaths have been from consumption; in 1909, 10 per cent.; in 1910, 9.5 per cent.

And while this reduction in mortality has been taking place, there has been an increase in the population, and an increase in the total number of deaths from all causes. The total deaths throughout the whole State, from all causes, were, in 1909, 140,261; in 1910 they were 147,629.

From these figures it seems fair to assume that the tuberculosis situation in the State as a whole is improving.

Taking the records for these two fields, the lowest mortality from pulmonary tuberculosis in Greater New York was 7,589 in 1902; and in the same year the rest of the State had its minimum mortality of 4,993. The maximum annual mortality for Greater New York was 8,996, recorded in 1907; the maximum mortality in the rest of the State occurred in 1892, the figures then being

6,180. The anti-tuberculosis campaign began in New York city several years before it was started throughout the rest of the State in 1907. The annual mortality in Greater New York since then has been as follows: 1907, 8,996; 1908, 8,867; 1909, 8,645; 1910, 8,690. The corresponding figures for the rest of the State are: 1907, 5,410; 1908, 5,449; 1909, 5,351; 1910, 5,369.

The total deaths from all causes were in 1909: Greater New York, 74,105; rest of State, 66,156; in 1910: Greater New York, 76,750; rest of State, 70,879. Thus while the total mortality from all causes in Greater New York in 1910 shows an increase of 3.5 per cent. over the returns for 1909, the mortality from pulmonary tuberculosis in the metropolis increased only 5 per cent. during the year. In the rest of the State the total mortality from all causes in 1910 shows an increase of 5.3 per cent. over the figures for 1909, while the mortality per 100,000 population from pulmonary tuberculosis in 1910 dropped 3.7 below the figures for 1909.

Mortality from Pulmonary Tuberculosis by Months 1890–1909 —
Greater New York and Rest of State

	Jan.	Feb.	Mar.	April	May	June
1890. Greater New York*............	1,008	706	657	575	588	527
Rest of State..................	757	549	538	527	460	422
Total....................	1,765	1,255	1,195	1,102	1,048	949
1891. New York City*..............	661	520	733	707	679	504
Rest of State..................	549	465	585	670	555	474
Total....................	1,210	985	1,318	1,377	1,234	978
1892. New York City*..............	665	598	728	691	654	508
Rest of State..................	621	598	544	561	540	497
Total....................	1,286	1,196	1,272	1,252	1,194	1,005
1893. New York City*..............	595	525	750	741	673	570
Rest of State..................	504	429	536	588	566	495
Total....................	1,099	954	1,286	1,329	1,239	1,065
1894. New York City*..............	628	563	609	551	567	557
Rest of State..................	512	500	581	540	526	425
Total....................	1,140	1,063	1,190	1,091	1,093	982
1895. New York City*..............	728	670	706	653	627	526
Rest of State..................	516	491	568	567	522	448
Total....................	1,244	1,161	1,274	1,220	1,149	974
1896. New York City*..............	650	582	969	677	665	612
Rest of State..................	502	502	521	512	528	485
Total....................	1,152	1,084	1,490	1,189	1,193	1,097
1897. New York City*..............	578	637	620	581	562	542
Rest of State..................	473	480	570	577	492	460
Total....................	1,051	1,117	1,190	1,158	1,054	1,002
1898. Greater New York............	615	592	705	629	669	604
Rest of State..................	436	439	461	471	458	403
Total....................	1,051	1,031	1,166	1,100	1,127	1,007
1899. Greater New York............	769	725	786	708	671	577
Rest of State..................	535	479	498	479	498	451
Total....................	1,304	1,204	1,284	1,187	1,169	1,028
1900. Greater New York............	676	686	816	802	765	616
Rest of State..................	464	445	547	500	520	454
Total....................	1,140	1,131	1,363	1,302	1,285	1,070
1901. Greater New York............	817	702	778	761	659	651
Rest of State..................	509	428	515	535	565	460
Total....................	1,326	1,130	1,293	1,296	1,224	1,111
1902. Greater New York............	613	666	736	669	658	615
Rest of State..................	425	434	499	485	477	365
Total....................	1,038	1,100	1,235	1,154	1,135	980
1903. Greater New York............	761	732	734	726	688	576
Rest of State..................	444	428	526	498	451	402
Total....................	1,205	1,160	1,260	1,224	1,139	978

* From 1890-97 the statistics are for New York City and Brooklyn.

Mortality from Pulmonary Tuberculosis — (Continued)

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1890. Greater New York*...	585	578	598	590	558	618	7,588
Rest of State.........	432	429	407	455	426	427	5,829
Total...........	1,017	1,007	1,005	1,045	984	1,045	13,417
1891. New York City*......	569	546	574	603	574	609	7,279
Rest of State.........	463	495	465	521	443	481	6,166
Total...........	1,032	1,041	1,039	1,124	1,017	1,090	13,445
1892. New York City*......	558	519	561	535	615	629	7,261
Rest of State.........	535	537	445	461	325	516	6,180
Total...........	1,093	1,056	1,006	996	940	1,145	13,441
1893. New York City*......	589	586	496	570	547	608	7,250
Rest of State.........	484	454	416	500	410	491	5,873
Total...........	1,073	1,040	912	1,070	957	1,099	13,123
1894. New York City*......	600	569	538	542	568	637	6,929
Rest of State.........	494	462	450	471	454	480	5,895
Total...........	1,094	1,031	988	1,013	1,022	1,117	12,824
1895. New York City*......	571	613	579	651	571	614	7,509
Rest of State.........	469	438	430	461	408	440	5,758
Total...........	1,040	1,051	1,009	1,112	979	1,054	13,267
1896. New York City*......	543	604	571	576	486	604	7,539
Rest of State.........	507	455	452	414	390	458	5,726
Total...........	1,050	1,059	1,023	990	876	1,062	13,265
1897. New York City*......	549	593	556	631	550	612	7 011
Rest of State.........	392	434	442	439	427	444	5,630
Total...........	941	1,027	998	1,070	977	1,056	12,641
1898. Greater New York....	664	598	647	630	645	732	7,730
Rest of State.........	452	421	429	422	404	453	5,249
Total...........	1,116	1,019	1,076	1,052	1,049	1,185	12,979
1899. Greater New York....	659	639	568	537	628	652	7,919
Rest of State.........	417	395	379	527	399	436	5,493
Total...........	1,076	1,034	947	1,064	1,027	1,088	13,412
1900. Greater New York....	673	619	562	663	623	661	8,162
Rest of State.........	429	428	418	415	388	421	5,429
Total...........	1,102	1,047	980	1,078	1,011	1,082	13,591
1901. Greater New York....	639	632	617	639	640	606	8,141
Rest of State.........	423	446	404	473	423	444	5,625
Total...........	1,062	1,078	1,021	1,112	1,063	1,050	13,766
1902. Greater New York....	632	585	550	638	613	614	7,589
Rest of State.........	406	399	367	389	338	409	4,993
Total...........	1,038	984	917	1,027	951	1,023	12,582
1903. Greater New York....	595	626	564	640	649	712	8,003
Rest of State.........	396	399	382	398	427	440	5,191
Total...........	991	1,025	946	1,038	1,076	1,152	13,194

* From 1890-97 the statistics are for New York City and Brooklyn.

Mortality from Pulmonary Tuberculosis—(Continued)

	Jan.	Feb.	Mar.	April	May	June
1904. Greater New York	702	728	869	871	783	643
Rest of State	485	451	563	528	514	493
Total	1,187	1,179	1,432	1,399	1,297	1,136
1905. Greater New York	731	686	830	814	767	648
Rest of State	438	454	552	526	519	457
Total	1,169	1,140	1,382	1,340	1,286	1,105
1906. Greater New York	731	732	872	774	793	758
Rest of State	452	466	515	575	435	383
Total	1,183	1,198	1,387	1,349	1,228	1,141
1907. Greater New York	816	822	907	903	801	692
Rest of State	419	470	548	491	501	447
Total	1,235	1,292	1,455	1,394	1,302	1,139
1908. Greater New York	804	862	830	815	765	693
Rest of State	427	457	544	578	484	434
Total	1,231	1,319	1,374	1,393	1,249	1,127
1909. Greater New York	749	707	840	861	775	717
Rest of State	420	446	522	538	483	425
Total	1,169	1,153	1,362	1,399	1,258	1,142
1910. Greater New York	767	706	859	809	755	656
Rest of State	437	450	568	502	487	412
Total	1,204	1,156	1,427	1,311	1,242	1,068

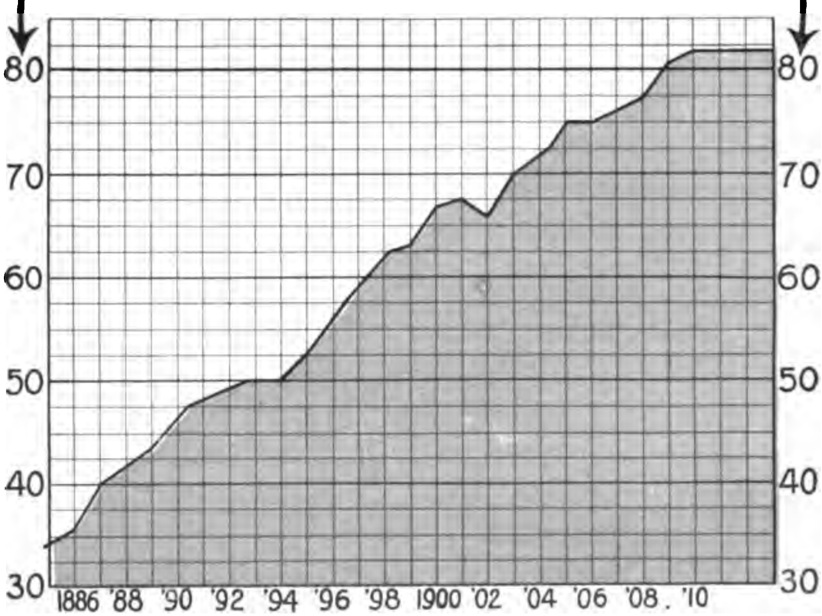
Mortality from Pulmonary Tuberculosis —(Concluded)

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1904. Greater New York....	674	652	590	654	670	680	8,516
Rest of State.........	472	423	400	415	434	464	5,642
Total............	1,146	1,075	990	1,069	1,104	1,144	14,158
1905. Greater New York....	657	655	619	679	714	732	8,532
Rest of State.........	433	435	437	436	417	423	5,527
Total............	1,090	1,090	1,056	1,115	1,131	1,155	14,059
1906. Greater New York....	725	708	670	733	714	766	8,976
Rest of State.........	382	366	327	357	380	413	5,051
Total............	1,107	1,074	997	1,090	1,094	1,179	14,027
1907. Greater New York....	676	665	596	661	664	793	8,996
Rest of State.........	444	461	377	419	408	425	5,410
Total............	1,120	1,126	973	1,080	1,072	1,218	14,406
1908. Greater New York....	728	639	674	650	689	718	8,867
Rest of State.........	423	430	415	434	412	411	5,449
Total............	1,151	1,069	1,089	1,084	1,101	1,129	14,316
1909. Greater New York....	683	635	585	649	695	749	8,645
Rest of State.........	445	404	373	440	395	460	5,351
Total............	1,128	1,039	958	1,089	1,090	1,209	13,996
1910. Greater New York....	728	665	674	666	662	743	8,690
Rest of State.........	452	420	404	389	398	450	5,369
Total............	1,180	1,085	1,078	1,055	1,060	1,193	14,059

TOTAL DEATHS BY YEARS PREVIOUS TO 1890

	Greater New York	Rest of State	Total
1885........	7,189	4,049	11,238
1886........	7,722	4,225	11,947
1887........	6,841	4,768	11,609
1888........	7,312	5,071	12,383
1889........	6,629	5,761	12,390

MORTALITY FROM CANCER. DEATHS PER 100,000 POPULATION SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

Mortality from Cancer

The reported mortality from cancer and deaths per 100,000 population due to cancer in the State since 1885 is shown by the following:

YEAR	Deaths from cancer	Deaths per 100,000 population	YEAR	Deaths from cancer	Deaths per 100,000 population
1885	1,887	33.6	1898	4,375	62.0
1886	2,050	35.8	1899	4,535	63.2
1887	2,363	40.5	1900	4,871	66.9
1888	2,497	41.9	1901	5,033	67.6
1889	2,638	43.5	1902	4,989	65.7
1890	2,868	46.3	1903	5,456	70.3
1891	3,028	47.9	1904	5,697	71.9
1892	3,152	48.9	1905	6,055	74.9
1893	3,232	49.4	1906	6,169	74.8
1894	3,305	49.7	1907	6,420	75.9
1895	3,554	52.7	1908	6,554	77.0
1896	3,789	55.3	1909	7,060	81.1
1897	4,131	59.4	1910	7,522	82.1

Reported mortality from Cancer in the sanitary districts for past 10 years —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	2,651	2,557	2,828	2,967	3,151	3,288	3,514	3,564	3,841	4,093
Hudson Valley	459	497	536	535	549	580	571	609	657	689
Adirondack and Northern	208	220	239	255	288	278	272	265	341	314
Mohawk Valley	267	282	276	314	331	310	352	336	397	411
Southern Tier	261	259	309	338	342	331	349	388	412	418
East Central	295	304	314	325	335	343	337	351	383	395
West Central	227	246	276	250	291	276	288	295	296	325
Lake Ontario and Western	665	624	678	713	768	763	717	746	783	839
Entire State	5,033	4,989	5,456	5,697	6,055	6,169	6,420	6,554	7,060	*7,522

* Includes 38 deaths in State Institutions.

Deaths from Cancer per 100,000 population in the —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	66	65	61	71	72	72	75	75	79	78
Hudson Valley	67	72	77	78	78	82	80	86	80	95
Adirondack and Northern	53	58	60	64	75	68	66	64	81	76
Mohawk Valley	65	67	66	73	76	69	76	72	85	84
Southern Tier	63	60	72	78	78	75	80	87	91	92
East Central	74	76	79	80	80	82	80	83	90	91
West Central	71	78	86	80	90	87	91	93	92	101
Lake Ontario and Western	75	71	75	78	81	80	73	75	73	79
Entire State	68	66	70	72	75	75	76	77	81	82

In each 1,000 Deaths there were from Cancer in the —

DISTRICTS	Decade 1885–1894	Decade 1895–1904	1905	1906	1907	1908	1909	1910
Maritime	21.6	31.8	39.4	30.9	40.7	44.6	47.4	48.9
Hudson Valley	25.8	37.6	44.2	48.1	44.1	49.5	53.3	54.2
Adirondack and Northern	32.0	42.0	48.0	45.1	43.1	43.8	54.5	48.8
Mohawk Valley	34.2	42.5	48.8	42.8	46.1	44.6	55.8	52.6
Southern Tier	35.5	46.5	53.5	51.3	50.5	55.7	59.1	60.7
East Central	36.4	51.8	52.0	53.8	50.3	51.2	57.8	56.1
West Central	37.5	49.5	57.2	56.1	55.2	60.8	60.5	67.2
Lake Ontario and Western	30.2	46.5	54.0	52.1	45.8	50.9	48.4	51.5
Entire State	25.0	37.0	44.2	43.9	43.4	47.3	50.3	51.0

During the past four years there were reported 26,516 deaths from cancer in this State, 10,567 (or 39.8 per cent.) being due to cancer of the stomach and liver, as will be seen from the following:

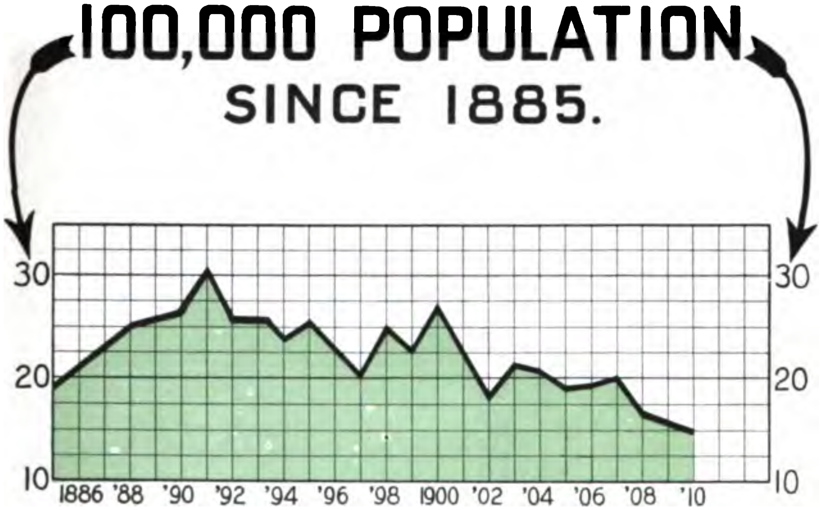
SEAT OF DISEASE	1907	1908	1909	1910
Cancer of mouth	206	169	267	285
Cancer of stomach and liver	2,396	2,561	2,677	2,933
Cancer of intestines and peritoneum	812	849	926	1,121
Cancer of skin	201	200	202	192
Cancer of breast	617	599	665	732
Cancer of female genital organs	946	1,043	1,146	1,096
Cancer of other or unspecified organs	1,222	1,113	1,177	1,163
Total	5,400	6,534	7,060	7,522

Mortality from Typhoid Fever

The following table shows the reported mortality from typhoid fever and deaths per 100,000 population due to typhoid since 1885:

YEAR	Deaths	Deaths per 100,000 population	YEAR	Deaths	Deaths per 100,000 population
1885	1,067	19.0	1898	1,810	25.6
1886	1,169	20.4	1899	1,604	22.4
1887	1,327	22.7	1900	1,948	26.7
1888	1,483	24.9	1901	1,741	23.4
1889	1,550	25.6	1902	1,318	17.4
1890	1,612	26.1	1903	1,665	21.5
1891	1,926	30.5	1904	1,652	20.9
1892	1,664	25.8	1905	1,554	19.2
1893	1,685	25.7	1906	1,568	19.0
1894	1,640	24.7	1907	1,673	19.8
1895	1,716	25.4	1908	1,375	16.0
1896	1,542	22.6	1909	1,315	15.1
1897	1,351	19.4	1910	1,374	15.0

MORTALITY
FROM
TYPHOID FEVER.
DEATHS PER 100,000 POPULATION SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

Deaths from Typhoid Fever per 100,000 population in the —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	20.0	20.2	16.8	17.0	16.2	15.2	17.2	13.2	12.6	11.7
Hudson Valley	34.3	36.0	25.4	35.1	28.4	26.1	27.3	21.5	20.0	21.3
Adirondack and Northern	24.4	24.7	27.8	31.5	26.7	27.9	26.1	18.9	19.1	24.4
Mohawk Valley	26.4	19.8	23.4	19.4	18.4	19.4	17.2	17.0	13.5	10.9
Southern Tier	24.8	23.3	25.5	21.2	17.5	27.9	20.3	20 1	22.5	16.2
East Central	25.7	17.7	17.1	19.4	16.9	14.1	18.8	17.0	16.0	24.1
West-Central	19.0	15.8	36.7	20.5	18.0	19.4	14.3	19.0	13 7	20.3
Lake Ontario and Western	28.0	27.8	30.4	24 5	25.2	25.8	27.1	22.8	20.0	18.3
Entire State	23.4	17.4	21.5	20.9	19.2	19.0	19.8	16.0	15.1	16.0

In each 1,000 deaths there were from Typhoid Fever in the —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	10	11	10	9	9	8	9	8	8	7
Hudson Valley	20	23	14	20	17	15	15	13	12	12
Adirondack and Northern	17	20	21	22	18	19	17	13	13	15
Mohawk Valley	17	14	16	13	12	12	10	11	9	7
Southern Tier	18	17	20	11	12	19	13	13	15	11
East Central	18	13	14	12	11	9	11	10	11	15
West Central	13	11	24	13	11	13	9	13	9	11
Lake Ontario and Western	20	20	21	17	17	16	17	15	13	12
Entire State	13	14	14	12	12	11	11	10	9	9

City Mortality from Typhoid Fever

The following shows the annual mortality by months from typhoid fever in the cities of the State since 1900; also total deaths from all causes, and typhoid death rate.

The death rate for years other than those in which official census was taken is based upon estimated population as shown by the average yearly increase between census periods.

MORTALITY FROM TYPHOID FEVER

Greater New York

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900......	53	31	30	24	35	35	52	67	104	97	93	97	718	3,437,202	70,870	20.8
1901......	62	36	42	48	28	29	53	76	97	109	76	71	727	....	70,722	20.4
1902......	51	22	26	36	36	46	61	90	96	121	99	78	762	....	68,131	20.8
1903......	40	44	42	40	46	30	56	70	74	84	69	59	654	....	67,898	16.8
1904......	33	30	43	28	43	32	50	84	82	91	74	69	659	....	78,043	16.9
1905......	50	27	33	30	27	37	72	99	90	73	50	51	648	4,013,781	73,631	15.8
1906......	28	32	25	32	33	31	54	77	84	104	83	56	639	....	75,962	15.5
1907......	40	41	43	65	52	38	47	69	82	104	87	72	740	....	79,205	17.4
1908......	30	21	25	32	36	25	47	73	83	77	49	40	538	....	73,075	12.8
1909......	36	25	26	18	31	33	39	56	94	95	66	45	564	....	74,105	12.7
1910......	38	27	31	24	23	37	53	58	71	78	66	52	558	4,799,639	76,750	11.6
Total...	461	336	366	386	390	373	574	819	957	1,033	822	690	7,207	....	808,392	

Buffalo

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900......	4	4	7	3	5	4	5	13	12	14	5	14	90	352,387	4,999	25.5
1901......	11	7	5	5	5	5	3	18	13	11	5	10	98	....	5,360	27.4
1902......	4	7	8	8	5	8	2	8	17	17	25	14	123	....	5,137	33.9
1903......	16	14	11	13	8	9	10	9	13	12	8	10	133	....	5,675	36.2
1904......	13	5	2	2	4	2	12	4	15	19	5	8	91	....	5,724	24.4
1905......	1	9	4	3	3	3	3	12	14	22	5	11	90	376,587	5,656	24.0
1906......	8	4	5	4	3	5	3	8	16	20	8	6	90	....	6,104	23.6
1907......	9	4	9	2	8	1	6	13	17	21	8	15	113	....	6,413	29.2
1908......	3	4	6	3	....	3	8	7	14	18	11	7	84	....	6,052	21.2
1909......	5	9	2	5	5	5	12	7	13	8	13	12	96	....	6,111	24.2
1910......	5	10	2	11	10	2	4	11	5	10	....	8	78	425,715	6,877	18.3
Total...	79	77	61	59	56	47	68	110	149	172	93	115	1,086	....	64,108	

Rochester

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900......	4	....	1	2	1	1	1	4	2	5	5	4	30	162,608	2,271	18.4
1901......	5	....	1	....	2	2	2	3	3	4	6	4	32	....	2,387	19.2
1902......	3	....	....	....	1	2	3	3	1	4	....	2	19	....	2,306	11.2
1903......	2	....	....	1	....	1	4	3	2	3	4	1	21	....	2,527	12.1
1904......	6	2	2	....	....	3	3	....	5	1	4	1	27	....	2,672	15.2
1905......	....	1	2	2	1	....	....	1	2	1	3	6	19	181,666	2,794	10.5
1906......	3	3	....	2	1	4	3	1	3	7	....	3	30	....	2,861	16.2
1907......	4	4	2	1	1	1	1	2	4	3	3	1	27	....	2,968	14.3
1908......	4	....	1	1	....	1	4	3	3	2	2	2	23	....	2,704	11.6
1909......	1	1	....	3	1	1	1	....	....	3	4	2	17	....	2,913	8.6
1910......	4	1	1	1	2	....	1	2	....	6	7	5	30	219,693	3,082	13.7
Total...	36	12	10	13	10	16	23	22	25	39	38	31	275	....	29,485	

Syracuse

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900......	....	3	2	1	....	1	1	4	9	6	3	1	31	108,374	1,642	29.1
1901......	3	1	1	1	1	2	2	2	3	1	2	1	20	....	1,541	18.1
1902......	....	....	2	....	1	1	....	2	....	2	1	1	10	....	1,513	8.9
1903......	1	2	2	....	1	1	2	....	2	3	1	3	18	....	1,607	15.8
1904......	....	....	4	....	1	1	1	1	4	3	....	2	17	....	1,752	14.7
1905......	2	1	1	....	2	1	....	....	4	5	....	1	17	117,503	1,813	14.5
1906......	2	1	1	....	....	....	1	....	1	2	3	....	11	....	1,845	9.2
1907......	....	....	....	1	2	1	2	2	1	2	2	1	14	....	1,916	11.6
1908......	1	....	....	3	....	2	1	2	2	5	2	1	19	....	2,036	15.2
1909......	1	4	....	1	1	....	....	2	1	3	1	....	14	....	1,946	11.1
1910......	1	....	....	....	1	3	3	4	8	6	9	3	38	138,087	2,124	27.5
Total...	11	12	13	7	10	13	13	19	35	38	24	14	209	....	19,735	

MORTALITY FROM TYPHOID FEVER — (*Continued*)

Albany

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	3	1	3	6	4	1	3	4	4	5	4	...	38	94,151	1,742	40.3
1901	2	3	1	1	2	3	...	3	4	...	...	1	20	...	1,751	21.1
1902	2	3	2	1	2	3	1	3	2	4	6	...	29	...	1,623	30.2
1903	1	3	1	2	...	...	1	3	1	3	1	3	19	...	1,808	19.7
1904	1	1	1	4	2	2	1	2	3	...	1	...	18	...	1,848	18.5
1905	1	1	3	...	...	1	1	3	1	2	5	1	19	98,374	1,813	19.3
1906	2	1	2	1	...	1	3	3	...	...	4	3	20	...	1,770	20.3
1907	3	3	5	1	...	...	2	2	...	2	...	2	20	...	1,900	20.0
1908	1	...	1	...	...	...	...	4	...	...	3	2	11	...	1,842	10.9
1909	2	2	1	1	...	...	1	5	...	1	3	3	19	...	1,759	18.8
1910	...	...	2	1	2	1	3	2	1	1	...	2	15	100,358	1,943	14.9
Total	18	18	22	18	12	12	16	34	16	18	27	17	228	...	19,799	

Yonkers

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	...	1	...	...	...	...	1	...	...	...	...	...	2	47,931	810	4.1
1901	2	1	...	...	...	...	...	...	2	...	1	2	8	...	842	15.9
1902	...	...	...	...	1	...	1	1	1	1	...	...	5	...	865	9.3
1903	2	...	...	...	...	...	...	...	2	...	3	1	8	...	842	14.2
1904	...	2	...	2	...	...	1	...	1	...	2	1	9	...	1,005	15.2
1905	...	...	...	...	...	...	...	...	...	...	1	...	1	61,716	1,020	1.6
1906	1	...	...	...	...	...	...	1	1	...	1	...	4	...	1,095	6.2
1907	...	...	...	...	...	...	3	1	1	1	...	2	8	...	1,068	11.9
1908	1	1	...	1	...	1	...	2	...	...	1	...	7	...	1,065	9.6
1909	...	...	...	...	1	1	1	2	...	...	...	...	5	...	1,125	6.9
1910	...	1	2	...	...	...	3	1	3	2	2	1	15	80,589	1,226	18.6
Total	6	6	2	3	2	2	10	8	11	4	11	7	72	...	10,963	

Troy

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	8	8	6	6	3	3	1	6	16	1	6	12	76	75,057	1,528	101.2
1901	7	4	2	5	4	2	3	4	2	5	2	2	42	...	1,662	55.7
1902	6	4	7	4	1	3	1	3	2	...	2	4	37	...	1,430	48.8
1903	3	1	2	1	1	2	6	...	1	3	3	2	25	...	1,450	32.8
1904	4	4	6	5	4	1	1	2	3	1	1	2	34	...	1,573	44.4
1905	3	3	7	7		3	2	1	2	2	2	4	36	76,910	1,633	46.8
1906	2	3	8	3		...	2	...	3	2	2	3	28	...	1,549	36.2
1907	2	3	1	...	1	1	2	3	4	2	...	1	20	...	1,626	25.8
1908	...	1	2	3	2	...	5	5	2	...	3	4	27	...	1,542	34.9
1909	3	1	...	...	1	1	...	3	2	2	3	1	17	...	1,487	22.0
1910	3	1	2	1	1	1	...	1	3	...	1	1	15	76,836	1,597	19.5
Total	41	33	43	35	18	17	23	28	40	18	25	36	357	...	17,077	

Utica

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	1	1	...	...	...	...	1	2	...	1	2	...	8	56,383	1,135	14.1
1901	...	...	1	...	...	...	1	2	3	...	2	...	9	...	1,031	15.6
1902	3	2	1	...	2	1	...	1	1	...	1	...	12	...	1,075	20.3
1903	...	1	1	1	...	1	...	...	4	...	2	...	10	...	1,059	16.6
1904	1	2	1	...	1	...	1	1	...	2	2	...	11	...	1,201	17.8
1905	...	...	...	2	...	...	1	...	2	...	1	...	6	62,934	1,143	9.5
1906	...	2	2	...	1	...	...	1	4	4	4	...	18	...	1,229	27.6
1907	...	2	1	...	...	1	1	...	1	3	...	1	10	...	1,260	15.2
1908	...	...	2	...	1	1	...	1	4	2	3	...	14	...	1,293	20.1
1909	1	1	...	1	1	1	...	...	2	1	3	...	11	...	1,153	15.8
1910	...	...	...	1	1	...	...	...	1	1	1	...	5	74,879	1,297	6.7
Total	6	11	9	5	7	5	5	8	22	14	21	1	114	...	12,876	

MORTALITY FROM TYPHOID FEVER — (*Continued*)

Schenectady

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900		3	3	3						3	1	1	14	31,682	554	44.2
1901			1	1			1	1	1	3	1	6	15		609	40.5
1902	1	1	2	3			1		1		1	1	11		658	26.0
1903	1	2	1	1	3	1		3		3		1	16		796	33.5
1904	3	2		1	1		1	1	2	1			12		794	22.6
1905			1		1	1				1		1	5	58,387	796	8.6
1906	2	1	1			1		2	1	1	1	1	11		909	17.8
1907	1			1				1	1	1		1	6		1,028	8.7
1908		1			1	1	1	1	3				8		920	10.9
1909								2	4		1	1	8		846	10.9
1910					1	2				2			5	73,450	1,070	6.8
Total	8	10	9	10	7	6	4	11	13	15	5	13	111		8,980	

Binghamton

1900	2	3	2		1	1			1	5	1	1	17	30,647	822	42.8
1901	8	3	1		2				3	3		1	21		755	52.4
1902	2	1	1		2	1		2	1	1			11		725	27.1
1903	3	1											4		619	9.7
1904			1			1	1					1	4		762	9.6
1905								1	1	1	1	1	5	31,422	678	12.0
1906		1	1						1		1		4		655	9.1
1907	1						1	1	2	2		1	8		673	18.2
1908					1		2	1		2	1		7		751	15.2
1909	3				1						2		6		712	13.1
1910	1		1					1	1	1	1		6	48,671	765	12.4
Total	20	9	7		7	3	4	6	10	15	7	5	93		7,917	

Elmira

1900	1	1	1		2	2	1	2		1	2	4	17	35,672	537	47.6
1901			3					1	2	1		2	9		570	25.4
1902		1	5	3	1		2	1	1				14		494	39.7
1903	1	1	2	2	2	3		4	4	3	4	2	28		523	80.0
1904	1	2	2		2		3	1	1		4	2	18		560	51.6
1905			1	2			1	2	1	2	1		10	34,687	553	28.8
1906	1	4			1			2	2	1	1	4	16		517	44.7
1907	4	1			1			2	2				10		564	28.0
1908	1		1		2		4		2			1	11		544	30.7
1909	2	1		1					5	2	1		12		546	33.5
1910	2		1					1	3	2	1		10	37,238	554	26.9
Total	13	11	16	8	11	5	11	16	23	12	14	15	155		5,962	

Auburn

1900	1	2					2		3		2	2	12	30,345	520	39.5
1901	1			1		1	1	1		1		1	7		420	22.9
1902		1			1							1	3		480	9.7
1903		1	2		1		1		1	1		1	8		530	25.8
1904		2		1			1	1	1	1	2		9		498	28.8
1905	1				1			2			1		5	31,422	522	15.9
1906		2				1			1				4		550	12.1
1907									1	1			2		531	6.0
1908			2	2	4	4		1		1	1	1	16		481	46.6
1909	2		1							2	1		6		499	17.5
1910			1				1			1			3	34,700	522	8.6
Total	5	8	6	4	7	6	6	5	7	8	7	6	75		5,553	

MORTALITY FROM TYPHOID FEVER — (*Continued*)

Jamestown

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900		1	1			1				1	1	4	9	22,892	280	39.3
1901	1	1					1		1		1	1	6		296	25.5
1902		1											1		259	4.1
1903		1	2						2		1		6		328	24.1
1904		1		1	1				2	3			8		324	31.3
1905	1							3	2				6	26,160	318	23.0
1906	1	1					1	2	2		1	1	9		276	33.8
1907	2	2										1	5		310	18.2
1908		1							1		2	1	5		312	17.5
1909	1					1		1	2				5		343	17.5
1910		1									4	4	9	31,523	404	28.5
Total	6	10	3	1	1	2	2	6	12	4	10	12	69		3,450	

Amsterdam

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900							1	2					3	20,929	296	14.3
1901		1			1					2	1		5		327	23.2
1902					1		1				1	1	4		354	18.1
1903					1			3	2		2	2	10		395	44.0
1904								1		3			4		357	17.1
1905		1	1						1			1	4	23,943	367	16.7
1906			1							1	3	1	6		420	24.8
1907		1	2		1								4		420	15.9
1908															411	0.0
1909					1		1				1		3		423	11.9
1910	1		1	1					1	1	1	1	7	31,586	540	22.1
Total	1	3	5	1	5		3	6	4	7	9	6	50		4,310	

Mt Vernon

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900				1									1	21,228	299	4.9
1901				1			1			1			3		326	13.6
1902					1	1							2		310	8.8
1903								1	1				2		282	8 5
1904				1		1	1	1				1	5		352	20.6
1905				1						1		3	5	25,006	331	20.0
1906	1	1	1					1		1			5		403	19.4
1907						1	1	3		3	1	1	10		399	37.7
1908			1					1					2		318	7.1
1909		1										1	2		392	7.2
1910		1	1						1				3	31,175	433	9.6
Total	1	3	3	4	1	3	3	7	2	6	1	6	40		3,845	

Niagara Falls

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	7	4	3		2		1	3			3	1	24	19,457	308	123.3
1901	2	3	4	4	2	5	2	4	1		1	2	30		329	143.7
1902	4	2	1	4	1	2	3	5	5	2	2	2	33		376	148.1
1903	3	8	5	1		2		2		3	2	1	27		372	114.0
1904	5	6	6	2	2	1	1	1	2	2		6	34		411	135.3
1905	6	4	2	5	3	1	4	5	1	3	4	11	49	26,560	424	184.4
1906	7	6	3	3	1	1		5	3	4	7	3	43		431	154.5
1907	4	6	4	4	1		1	3	5	4	2	3	37		531	126.0
1908	4	3	2	3	5		3	1	3	1		3	28		451	87.1
1909	5		3		3	3	1	1	2	1	2	3	24		465	74.9
1910	3	5	3		1	2	3	5	1	2	2	3	30	30,617	549	97.9
Total	50	47	36	26	21	17	19	35	23	22	25	38	350		4,649	

MORTALITY FROM TYPHOID FEVER —(*Continued*)

New Rochelle

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900									1				1	14,720	265	6 8
1901					1		1		1	1		2	6		263	38.0
1902							1	1			1	2	5		231	29.3
1903		1					1				1	1	4		2C8	22.0
1904				1		1				1			3		274	15.5
1905		1		1	1		1						4	20,480	285	19.5
1906		1		1	1			1	1				5		341	23.2
1907			1						2		1	1	5		338	22.0
1908	1		1	1			1		2			1	7		329	28.0
1909						1		2		2	1		6		323	24.1
1910								1					1	29,229	342	3.4
Total	1	3	2	4	3	2	5	5	7	4	4	7	47	....	3,199	

Poughkeepsie

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900		1	2	2				2			3	1	11	24,029	462	45.7
1901	2		2	2		1	1	1		1			10		426	41.1
1902		1	1	1			1	1					5		423	20.3
1903	1	3	1	2					1			3	11		462	44.2
1904	2	3	8	1			1						15		522	59.7
1905	1	3	1	2	1	1			1			1	11	25,379	421	43.3
1906		1		1			1	1	1	2	1	2	10		441	39.4
1907	2	4	3	9	1	1			4	1	2	2	29		525	112.0
1908	2	3				1			1	2			9		483	34.5
1909		1	2		1		1		1				6		501	23.0
1910							1	1	1	1		1	5	28,055	466	17.8
Total	10	20	20	20	3	4	6	6	10	7	6	10	122	....	5,132	

Watertown

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	3	4		1	2	1	3		2	2	1	3	22	21,696	397	101.4
1901			2	1	2			1	1	1			8		347	35.6
1902		2			3	1		1	3	1	1	3	15		316	64.7
1903		2	5		3	2	1	2			1	1	17		356	71.0
1904	3	22	18	4	3	1					1		52		413	211.0
1905				2				1	1	1	1		6	25,447	384	23.6
1906	1			1					5	1	3	2	13		460	50.0
1907			2		2	1		1	2	1	1		10		504	37.1
1908				1	1	2	2	1	2		2		11		404	39.0
1909	2		2	1			1		1	2	1	1	11		423	39.0
1910		3	3	3	1	1			4	4	3	2	24	26,792	467	89.6
Total	9	33	32	14	17	9	7	7	21	13	15	12	189	....	4,471	

Kingston

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900					1						1		2	24,535	470	8.1
1901	1							1	1				3		466	12.1
1902					2	1			1				4		399	16.0
1903	2	1	1			1							5		426	19.9
1904									1	2			3		452	11.8
1905		1			1			2	2	1	1		8	25,556	486	31.3
1906		1					1		1		1		4		473	15.6
1907		1		2			1		1	1	1		7		478	27.0
1908								2	1	1	2		6		442	22.9
1909	1		2					2		2	1		8		519	30.6
1910		2	2	1									5	25,929	475	19.2
Total	4	6	5	3	4	2	2	7	8	7	7	...	55	....	5,086	

MORTALITY FROM TYPHOID FEVER —(*Continued*)

Newburgh

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	1	1	....	....	....	....	....	....	4	3	....	2	11	24,943	551	44.1
1901	....	....	....	....	....	....	....	....	4	....	2	....	6	....	442	23.7
1902	1	1	....	....	....	....	1	1	2	3	2	1	12	....	471	47.0
1903	....	....	....	....	....	....	1	2	3	2	....	1	9	....	469	34.7
1904	....	....	1	1	2	....	1	1	1	....	2	2	11	....	524	42.0
1905	2	....	1	....	1	....	....	....	3	1	....	2	10	26,498	503	37.1
1906	1	....	....	1	....	....	2	2	4	1	....	....	11	....	527	41.3
1907	1	....	1	....	1	1	1	2	1	1	2	....	11	....	530	41.0
1908	2	....	1	....	1	....	....	1	....	1	1	3	10	....	440	36.4
1909	....	....	....	....	....	....	1	....	2	2	3	5	13	....	482	49.0
1910	....	....	....	....	1	....	....	3	5	2	....	1	12	25,868	509	43.1
Total	8	2	4	2	6	1	7	12	29	16	12	17	116	....	5,448	

Cohoes

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	3	5	6	5	2	1	1	2	....	1	..	1	27	23,910	471	113.0
1901	2	3	....	1	1	4	....	1	....	....	....	1	14	....	466	58.4
1902	7	8	5	6	1	....	....	....	....	....	....	5	32	....	442	133.2
1903	6	5	5	..	1	....	1	1	....	1	1	1	22	....	465	91.3
1904	1	8	8	5	3	....	....	....	....	....	....	....	25	....	459	103.6
1905	....	2	4	2	1	2	2	....	....	....	....	1	14	24,183	520	57.9
1906	3	4	1	1	....	2	....	....	....	1	....	2	14	....	467	57.8
1907	1	2	2	3	2	....	....	....	1	1	2	4	18	....	510	78.2
1908	2	5	2	1	2	1	....	....	....	1	....	....	15	....	430	62.0
1909	1	2	2	1	2	2	...	3	1	1	...	5	20	....	488	82.2
1910	2	2	3	4	1	1	....	...	....	....	1	5	19	24,737	509	76.8
Total	39	46	38	29	16	13	4	7	2	6	5	25	221	....	5,227	

Oswego

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	....	....	3	....	....	....	1	2	2	....	1	1	10	22.199	421	45.0
1901	2	....	....	1	....	....	....	....	....	2	....	....	5	....	334	22.4
1902	....	....	2	....	1	....	1	....	....	....	....	....	4	....	324	17.5
1903	2	....	3	....	....	....	2	2	1	....	....	2	12	....	324	53.5
1904	....	....	2	1	2	....	2	3	1	1	....	....	12	....	391	62.3
1905	1	3	1	....	1	....	2	2	....	3	3	3	19	22,572	406	84.1
1906	2	1	1	....	1	1	....	1	2	....	2	2	13	....	376	58.0
1907	2	....	1	2	1	1	....	1	3	....	4	....	15	....	360	66 0
1908	3	....	2	....	2	....	1	....	1	....	4	1	14	....	376	62.2
1909	1	1	2	1	1	....	....	....	....	....	....	....	6	....	336	26.6
1910	1	....	2	....	....	....	1	2	....	1	1	4	12	23,410	385	51.2
Total	14	5	19	5	9	2	10	13	10	7	15	13	122	....	4,033	

Gloversville

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	....	....	....	....	....	....	....	1	2	4	3	....	9	18,349	232	49.0
1901	....	....	....	....	....	....	....	....	....	....	1	....	1	....	263	5.4
1902	3	....	....	....	....	1	1	1	....	1	1	....	8	....	243	43.3
1903	....	1	....	....	....	....	....	....	....	....	....	1	2	....	287	10.8
1904	1	....	....	....	....	....	....	....	....	....	....	....	1	....	258	5.4
1905	....	....	....	....	....	1	1	1	....	....	1	....	4	18,672	235	21.4
1906	....	....	....	....	....	1	....	....	....	....	....	....	1	....	277	5.3
1907	....	....	....	....	....	....	1	....	....	....	....	....	1	....	309	5.3
1908	1	....	....	....	....	....	....	....	1	3	1	1	7	....	341	37.3
1909	....	....	....	....	....	....	....	....	....	1	1	....	2	....	300	10.7
1910	....	....	....	....	....	1	....	1	....	....	....	....	2	20,730	321	9.6
Total	5	1	....	....	....	4	3	4	3	8	8	2	38	....	3,066	

MORTALITY FROM TYPHOID FEVER — (Continued)

Rome

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900												1	1	15,343	239	6.5
1901	1											1	2		277	12.2
1902		1			1		1	1					4		261	25.2
1903			1						1				2		248	18.6
1904				1						1		1	3		270	24.5
1905			1		2	2						2	7	16,562	266	42.3
1906					1			1	1		1	1	5		299	28.2
1907		1									1	1	3		340	17.0
1908	1		3								1		5		360	26.4
1909										1		2	3		382	16.0
1910			1	1						1		1	4	20,632	410	19.3
Total	2	2	6	2	4	2	1	2	2	3	3	10	39		3,352	

Lockport

1900								2	1				3	16,581	266	18.0
1901			2	2	3	1	2	1	1				12		284	71.5
1902					1		1	1	1	1		1	6		237	35.4
1903	1			2	1		2	4	1	1		1	13		283	75.7
1904			1		1	1			1	1		1	6		287	34.6
1905			1	1		1				3	2	1	9	17,552	261	51.8
1906		2		2	1	2			2	3			12		241	67.6
1907	1		3		2				2	1			9		274	50.1
1908			3		5	2				1			11		250	60.7
1909	1							4	1	2	1		9		276	49.7
1910				1						1			2	17,993	299	11.1
Total	3	2	10	8	14	7	5	12	10	14	3	4	92		2,958	

Dunkirk

1900		3	1	1					1				6	11,616	184	51.6
1901				2	1					1			4		165	32.4
1902	1	1	4	1		1			1		1		10		233	76.5
1903	1	1		1								1	4		237	29.0
1904				1	1	1	1			2			6		274	41.3
1905	1		1						1	1		2	6	15,250	228	39.3
1906	2							1		1		1	5		255	31.4
1907	2	1	1	1			1	3		1	2	1	13		265	71.8
1908		1						1					2		241	11.1
1909										1	1		2		202	11.1
1910					1		1	1				1	4	17,308	279	23.1
Total	7	7	7	7	3	2	3	6	3	7	4	6	62		2,563	

Ogdensburg

1900	1				1						2	1	5	12,633	205	39.5
1901	2			1	1								4		252	31.4
1902			1	1	2	1	2		1				8		204	62.3
1903	2		2	1	1					1	1		8		233	61.7
1904				2	4	1		1				1	9		238	68.9
1905	1				1		2		1	2			7	13,179	251	53.1
1906				1				2	3		3	1	10		269	67.3
1907	1			1			1		1	1	1	1	7		265	47.1
1908		1			1				1		1		4		252	26.8
1909			2				1			1			4		245	26.8
1910		2							2	1	1		6	15,981	266	37.5
Total	7	3	5	7	11	2	6	3	9	6	9	4	72		2,680	

MORTALITY FROM TYPHOID FEVER—(*Continued*)

Middletown

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900			2										2	14,522	266	13.7
1901			1				1						2		228	13.8
1902	1			1				1	1	1		3	8		236	55.1
1903									1		1		2		225	13.8
1904										1			1		263	6.9
1905					1			2	1	2			6	14,516	245	41.3
1906	1							1			1		3		238	18.8
1907	1							1		1			3		240	18.8
1908					1	1		1	2		1	1	7		266	42.1
1909	1			1					1				3		256	18.1
1910	1						1				1	1	4	15,297	275	26.1
Total	5		3	2	2	1	2	6	6	5	4	5	41		2,738	

Glens Falls

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	1						1	1		1		2	6	12,613	240	47.6
1901	2			1				1		3		1	8		271	61.4
1902					1	1							2		196	14.9
1903						1			1			2	4		175	28.9
1904		4					1		1	1			7		223	49.2
1905										1		2	3	14,650	220	20.4
1906			1					1	3	1		1	7		262	46.5
1907	1						2	1		2		1	7		229	45.3
1908	1			1					1	1	2		6		207	36.9
1909											1		1		226	6.1
1910			1		1								2	15,268	241	13.1
Total	5	4	2	2	2	2	4	4	6	10	3	9	53		2,490	

Watervliet

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900		1	2	1				2	3		1	1	11	14,321	268	77.1
1901		1	4			2					1		8		246	55.6
1902	3	2	3		1								9		210	62.3
1903	2	1	2		2								8		238	55.2
1904	2	1	4	1								1	9		225	61.8
1905		1		1	1	1		1		1		1	7	14,600	287	47.9
1906		1	2		2		1	1					7		248	47.7
1907			1		2								3		254	20.4
1908					1	1	1			3			6		253	41.1
1909								1					1		230	6.8
1910			1	1	1	1		2		1			7	15,099	260	46.4
Total	7	8	19	4	10	5	2	7	3	5	2	4	76		2,719	

Ithaca

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	1				1				1	1	1	1	6	13,136	218	45.6
1901	1							1		2	2		6		192	44.6
1902											1		1		214	7.3
1903	1	27	11	4	1			2	1	2		1	50		269	357.0
1904	1	2							1				4		228	27.9
1905					1					1			2	14,615	209	13.7
1906											1	1	2		212	6.8
1907															242	0.0
1908						1							1		249	6.4
1909		1						1	1				3		211	19.2
1910			1				1		1	1	1		5	14,815	244	33.7
Total	4	30	12	4	3	1	1	4	5	7	6	3	80		2,488	

MORTALITY FROM TYPHOID FEVER —(*Continued*)

Olean

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900						1							1	9,462	130	10.5
1901								1	1				2		110	20.8
1902		1	1							1			3		117	30.7
1903				1			1					1	3		104	30.3
1904	1						1						2		138	20.0
1905														10,163	122	0.0
1906						1		1					2		139	20.0
1907									1	1			2		138	19.1
1908								2		1			3		139	22.1
1909			2										2		211	11.1
1910														14,814	188	0.0
Total	1	1	3	1		2	2	4	2	3		1	20		1,536	

*Lackawanna**

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1910										1			1	14,549	397	6.0
Total										1			1		547	

Corning

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900			1				1	2	1		1		6	11,061	202	54.2
1901	1					1		2			1		5		178	43.2
1902		1										2	3		149	24.9
1903	2		1				1		1	1			6		167	48.0
1904	1				1		1	1			1	1	6		200	46.1
1905	1						1			2			4	13,515	217	30.0
1906								1	3	1	1		6		188	43.1
1907	2	1	1		1				1	2	2		10		268	69.0
1908					2	1		3	1	4	1		12		232	78.2
1909	2	1	3	3	1	1		2	2	1	2	1	19		217	12.3
1910			1		1		2		1	2	1		8	13,742	200	58.2
Total	9	3	7	3	6	3	6	11	10	13	10	4	85		2,218	

Hornell

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	1							1	1				3	11,918	165	25.1
1901			1							1	2		4		174	32.8
1902							1	1		2			4		154	32.1
1903		1	2				1	1	2				7		191	55.0
1904											1		1		204	7.7
1905								1			1	2	4	13,259	202	30.2
1906											1		1		189	7.5
1907												1	1		184	7.5
1908									2				2		209	14.1
1909							1		1			1	3		185	21.2
1910		1						1	3				5	13,637	174	36.6
Total	1	2	3				3	5	9	3	5	4	35		2,031	

* Incorporated in 1909; formed from part of the town of West Seneca.

MORTALITY FROM TYPHOID FEVER —(*Continued*)

Geneva

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900														10,433	154	0.0
1901					1				3	1			5		176	46.3
1902				1									1		167	9.0
1903	1		1						2	1		1	6		174	52.1
1904		1		2				1			1		5		187	42.0
1905		1						2			1		4	12,249	169	32.7
1906		1									2		3		203	24.0
1907						1			1				2		179	15.4
1908		1								1			2		151	22.1
1909								1			1		2		175	14.7
1910	2		1										3	12,458	175	24.1
Total	3	4	2	3	1	1	...	4	6	3	5	1	33	....	1,910	

Little Falls

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900					1			1		4	3	4	13	10,381	166	125.2
1901				1	1					1			3		130	28.5
1902			1			1	1	1					4		92	37.5
1903								1			1	1	3		114	27.7
1904						1			2			1	4		143	36.4
1905														11,122	140	0.0
1906									2		1	2	5		153	44.7
1907			1										1		180	8.8
1908						1			1		1		3		136	25.9
1909												1	1		183	8.6
1910	1												1	12,326	192	8.1
Total	1	...	2	1	2	3	1	3	5	5	6	9	38	....	1,629	

North Tonawanda

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900									1				1	9,069	103	11.0
1901			1		1			1					3		102	32.3
1902				1									1		114	10.5
1903	1									3			4		106	41.1
1904			1	1	1					3			6		128	30.2
1905		1	1				1		2				5	10,157	145	39.3
1906									1	1			2		139	19.3
1907				1	1						2	1	5		137	47.2
1908			1	1		1	1				1	1	6		152	54.6
1909			2						2		1	1	6		162	55.6
1910			2			1			1			1	5	12,033	160	41.6
Total	1	1	8	4	3	2	2	1	7	7	4	4	44	....	1,448	

Cortland

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900										1		2	3	9,014	117	33.2
1901	7	1	1						1	1			11		139	116.2
1902											1		1		108	10.1
1903				1	1								2		163	20.0
1904											1		1		151	9.2
1905	1						1	1					3	11,272	123	26.6
1906										1			1		151	8.7
1907								1		1	1		3		155	24.6
1908		1											1		177	7.9
1909										1	2		3		162	23.9
1910			1			1			1	2	2	2	9	11,517	219	78.1
Total	8	2	2	1	1	1	1	2	2	7	7	4	38	....	1,665	

MORTALITY FROM TYPHOID FEVER — (*Continued*)

Hudson

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	....	2	5	1	....	1	....	....	....	....	....	....	9	9,528	203	94.4
1901	....	....	1	2	1	....	....	....	....	....	....	....	4	....	190	41.3
1902	1	1	6	....	....	....	....	....	....	....	....	....	8	....	181	81.3
1903	....	1	1	....	....	....	....	....	1	....	....	....	3	....	175	30.0
1904	....	4	3	6	....	....	1	1	....	1	....	1	17	....	227	167.7
1905	1	1	....	....	....	2	....	1	....	....	....	....	5	10,290	207	48.5
1906	1	....	....	1	....	....	....	....	2	....	....	....	4	....	203	38.0
1907	1	....	....	....	....	....	....	....	....	....	....	....	1	....	198	9.4
1908	....	....	....	....	....	....	....	....	2	....	....	....	2	....	166	18.1
1909	....	....	....	....	1	....	....	....	....	....	....	....	1	....	172	9.1
1910	1	1	1	....	....	....	....	1	1	1	....	....	6	11,462	236	52.3
Total	5	10	17	10	2	3	1	3	6	2	...	1	60	....	2,158	

Plattsburgh

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	....	1	....	....	1	....	....	....	....	....	....	....	2	8,434	157	23.7
1901	....	....	....	....	1	1	....	....	....	1	....	....	3	....	159	34.1
1902	....	....	....	....	....	....	....	....	....	....	1	....	1	....	115	11.0
1903	....	....	....	....	....	....	....	....	....	....	....	1	1	....	123	21.1
1904	....	....	....	....	....	....	....	....	....	....	....	....	....	....	161	0.0
1905	....	....	....	....	1	....	....	....	1	....	....	2	4	10,184	160	39.2
1906	....	....	....	....	....	....	....	....	1	2	....	....	3	....	130	28.7
1907	....	....	....	....	....	....	....	1	1	....	....	1	3	....	139	27.6
1908	....	....	....	....	....	....	....	....	....	....	....	....	....	....	129	0.0
1909	....	....	....	....	....	....	....	....	2	....	1	....	3	....	199	26.2
1910	....	....	....	....	....	....	1	1	....	....	1	....	3	11,182	195	26.8
Total	....	1	....	....	3	1	1	2	5	3	3	4	23	....	1,667	

Rensselaer

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	2	1	1	....	2	....	....	....	....	....	....	1	7	7,466	145	93.7
1901	1	1	1	1	1	....	....	....	....	....	....	....	5	....	128	61.6
1902	2	....	....	1	....	....	....	....	....	1	1	3	8	....	163	91.2
1903	....	1	....	1	....	....	....	....	....	1	....	....	3	....	168	31.8
1904	....	3	....	2	....	....	2	....	....	....	1	1	9	....	168	89.4
1905	....	....	....	....	1	....	1	1	....	1	....	....	4	10,715	184	37.3
1906	....	1	....	....	1	....	....	....	....	....	....	....	2	....	162	18.6
1907	....	....	....	1	3	....	....	1	....	....	1	1	7	....	170	58.3
1908	3	1	....	....	....	....	....	....	....	....	....	....	4	....	150	30.0
1909	....	....	....	....	1	....	....	1	....	....	2	....	4	....	174	29.9
1910	1	1	1	....	....	....	....	....	....	....	....	....	3	10,712	158	28.0
Total	9	9	3	6	9	....	3	3	....	3	5	6	56	....	1,770	

Fulton

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	....	....	....	....	....	....	....	....	....	....	....	....	......	8,206	112	......
1901	....	....	....	....	....	....	1	....	....	....	....	1	2	....	88	24.0
1902	....	....	....	....	....	....	....	....	....	....	....	1	1	....	106	11.8
1903	1	....	....	1	....	....	1	....	1	....	2	2	8	....	144	93.2
1904	1	....	1	....	....	....	....	....	....	....	....	3	5	....	123	34.8
1905	....	....	1	....	....	....	....	....	....	....	....	1	2	8,847	162	22.6
1906	....	....	....	....	....	....	....	1	....	2	....	....	3	....	137	56.5
1907	....	....	....	....	....	....	....	....	1	1	....	....	2	....	116	22.0
1908	....	....	....	....	2	....	....	1	1	1	....	....	5	....	150	42.5
1909	....	....	....	....	....	....	....	....	....	....	....	....	....	....	167	0.0
1910	....	....	....	1	....	....	....	....	....	....	....	....	1	10,550	155	9.5
Total	2	....	2	2	2	....	2	2	3	4	2	8	29	....	1,460	

MORTALITY FROM TYPHOID FEVER —(*Continued*)

Johnstown

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900		1									6		7	10,130	109	69.1
1901															117	
1902					1			1					2		134	20.0
1903	2	1											3		156	30.1
1904															124	
1905												1	1	9,845	145	10.2
1906				1								1	2		119	20.4
1907															149	
1908						1						1	2		123	21.1
1909															155	
1910											1		1	10,476	143	9.5
Total	2	2		1	1	1		1			7	3	18		1,474	

Oneonta

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900		1							1				2	7,147	89	27.9
1901											1		1		112	13.6
1902	1	1	1						1			1	5		99	56.5
1903						1					1		2		110	26.0
1904	1								2			1	4		139	50.8
1905	1							1					2	8,054	135	24.8
1906			2					1			1		4		131	48.6
1907								1			1		2		164	23.8
1908					1				2		1	2	6		156	68.2
1909			2						1	2		2	7		152	79.6
1910				1					1				2	9,552	181	20.9
Total	3	2	5	1	1	1		3	8	2	5	6	37		1,468	

Port Jervis

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900			1	1			1						3	9,385	163	31.9
1901				1			1			1			3		164	31.8
1902	1				2		1				1		5		176	52.5
1903			1			3	1		1			1	7		165	73.1
1904	3					2			1		1		7		193	72.6
1905			1		2			2		2			7	9,695	179	72.2
1906							1		2				3		176	31.0
1907		1							1	2		1	5		176	51.0
1908															168	
1909						1		1					2		183	20.1
1910									1		2	3	6	9,304	170	64.5
Total	4	1	3	2	4	6	5	3	6	5	4	5	48		1,913	

Oneida

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900	1												1	7,538	86	13.3
1901							1		1				2		111	25.9
1902					1						2		3		108	38.0
1903															111	
1904						1		1	1				3		112	36.3
1905														8,420	131	
1906									1				1		131	11.8
1907															128	
1908									1	1			2		134	19.8
1909															139	
1910			1	1	1					1			4	8,316	117	48.1
Total	1		1	1	2	1	1	1	4	2	2		16		1,308	

MORTALITY FROM TYPHOID FEVER — (*Concluded*)

Tonawanda

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total	Population	Total mortality (all causes)	Death rate per 100,000 population
1900								1					1	7,421	86	13.4
1901								1					1		106	13.3
1902								1	1	2	1		5		114	67.3
1903	1							1					2		98	26.0
1904			1	1						1			3		89	38.4
1905		1						1					2	7,904	98	25.3
1906	1	1				1			1				4		83	50.6
1907		1					1						2		109	25 0
1908			1		1	1			1	1	1	1	7		103	95.6
1909		1			1								2		105	27.3
1910		1	2										3	8,308	106	36.1
Total	2	5	4	1	2	2	1	5	3	4	2	1	32		1,097	

Mortality from Diphtheria

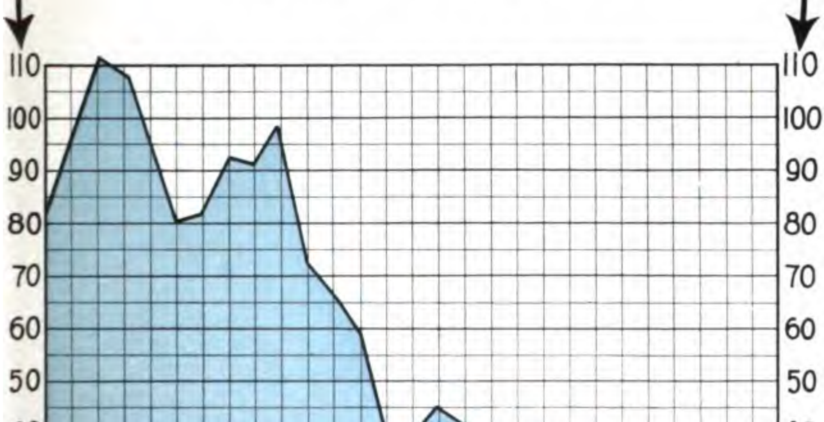
The reported mortality from Diphtheria since 1885 and deaths per 100,000 population is shown by the following:

YEAR	Deaths from diphtheria	Deaths per 100,000 population due to diphtheria	YEAR	Deaths from diphtheria	Deaths per 100,000 population due to diphtheria
1885	4,508	80.3	1898	2,612	37.0
1886	5,597	97.8	1899	2,786	38.9
1887	6,490	111.3	1900	3,306	45.4
1888	6,448	108.4	1901	3,026	40.7
1889	5,885	96.9	1902	2,859	37.7
1890	4,915	79.5	1903	3,035	39.2
1891	5,072	80.3	1904	3,041	38.4
1892	5,918	91.9	1905	2,296	28.4
1893	5,947	91.0	1906	2,691	32.6
1894	6,592	99.3	1907	2,603	30.9
1895	4,989	74.0	1908	2,473	28.9
1896	4,597	67.1	1909	2,313	26.5
1897	4,115	59.2	1910	2,433	26.5

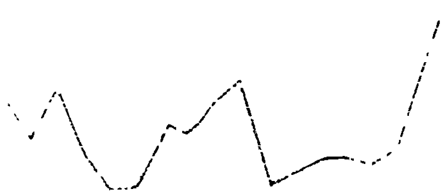
Deaths from Diphtheria per 100,000 *population in the* —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	55.3	52.6	54.6	51.3	37.5	43.5	39.7	38.8	37.0	34.2
Hudson Valley	33.7	25.1	19.4	23.2	21.1	22.9	31.6	21.6	14.4	16.7
Adirondack and Northern	23.3	11.4	14.1	16.0	10.2	16.3	16.2	12.7	7.6	11.3
Mohawk Valley	34.1	28.5	22.5	24.6	15.6	25.4	17.4	15.6	11.3	16.4
Southern Tier	18.5	27.9	17.2	23.5	16.1	13.7	20.0	14.1	15.8	12.1
East Central	15.8	10.8	12.2	14.3	8.6	10.5	15.2	19.1	10.0	12.0
West Central	8.8	10.4	12.6	15.2	11.7	8.4	15.0	10.9	7.8	5.3
Lake Ontario and Western	26.7	22.9	34.5	32.7	25.5	26.4	19.1	11.0	17.6	24.0
Entire State	40.7	37.7	39.2	38.4	28.4	32.6	30.9	28.9	26.6	26.6

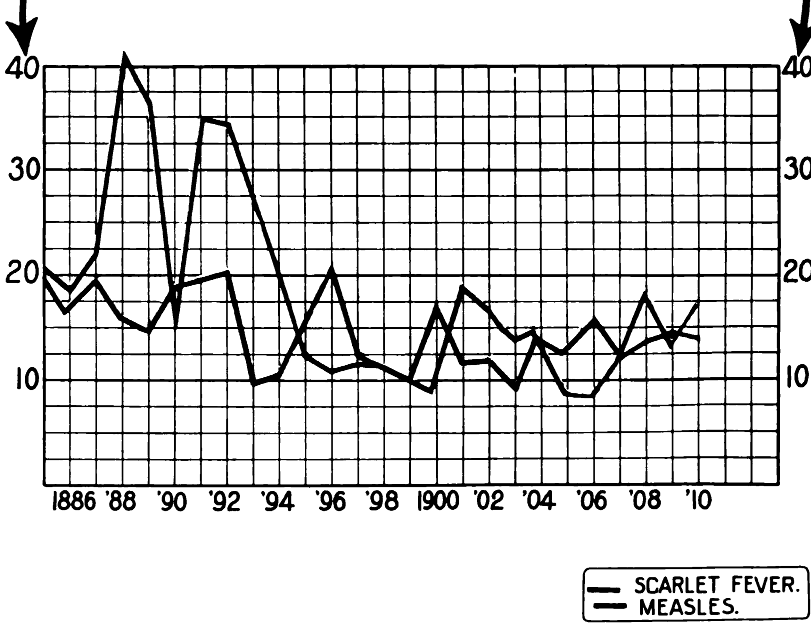
MORTALITY
FROM
DIPHTHERIA.
DEATHS PER 100,000 POPULATION SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH



MORTALITY
FROM
SCARLET FEVER AND MEASLES.
DEATHS PER 100,000 POPULATION
SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

In each 1,000 *deaths there were from Diphtheria in the* —

DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	28	28	31	26	21	24	21	23	22	22
Hudson Valley	20	16	12	13	12	13	17	13	9	10
Adirondack and Northern	17	9	10	11	7	11	11	9	5	7
Mohawk Valley	22	20	16	15	11	15	10	10	7	10
Southern Tier	13	21	14	19	11	9	13	9	10	8
East Central	11	8	9	9	6	7	10	7	6	7
West Central	8	8	8	10	7	5	9	7	5	4
Lake Ontario and Western	18	17	22	22	17	17	12	12	12	16
Entire State	23	23	24	21	17	19	18	18	16	17

Scarlet Fever and Measles

The reported mortality from scarlet fever and measles, and deaths per 100,000 population is shown by the following:

YEAR	Deaths from scarlet fever	Deaths per 100,000 population from scarlet fever	YEAR	Deaths from measles	Deaths per 100,000 population from measles
1885	1,184	21.1	1885	1,170	20.8
1886	1,011	17.7	1886	895	15.6
1887	1,267	21.7	1887	1,205	20.7
1888	2,452	41.2	1888	944	15.9
1889	2,205	36.4	1889	899	14.8
1890	913	14.8	1890	1,161	18.8
1891	2,252	35.6	1891	1,200	19.0
1892	2,177	33.8	1892	1,350	20.9
1893	1,626	24.8	1893	789	12.1
1894	1,227	18.8	1894	900	13.5
1895	850	12.6	1895	1,266	18.8
1896	759	11.1	1896	1,495	21.8
1897	841	12.1	1897	873	12.5
1898	837	11.8	1898	838	11.8
1899	730	10.2	1899	756	10.5
1900	689	9.4	1900	1,333	18.3
1901	1,430	19.2	1901	859	11.6
1902	1,215	16.0	1902	929	12.2
1903	1,057	13.6	1903	721	9.3
1904	1,194	15.1	1904	1,170	14.8
1905	726	9.0	1905	988	12.2
1906	690	8.4	1906	1,369	16.6
1907	1,032	12.2	1907	997	11.8
1908	1,688	19.8	1908	1,175	13.7
1909	1,205	14.0	1909	1,272	15.0
1910	1,617	17.6	1910	1,285	14.0

In each 1,000 deaths there were from Scarlet Fever in the —

DISTRICTS	1901	1902	1903	1904	1903	1906	1907	1908	1909	1910
Maritime	15	13	10	11	6	6	9	17	10	12
Hudson Valley	7	5	7	3	4	1	3	5	3	8
Adirondack and Northern	6	6	4	5	2	2	1	2	1	3
Mohawk Valley	4	13	11	11	6	7	3	7	7	4
Southern Tier	3	5	5	9	3	1	3	2	3	7
East Central	5	2	2	6	9	4	3	2	5	6
West Central	2	1	1	1	2	2	3	2	3	4
Lake Ontario and Western	4	4	6	2	5	4	4	9	15	2
Entire State	11	11	8	8	5	5	7	12	9	11

In each 1,000 deaths there were from Measles in the —

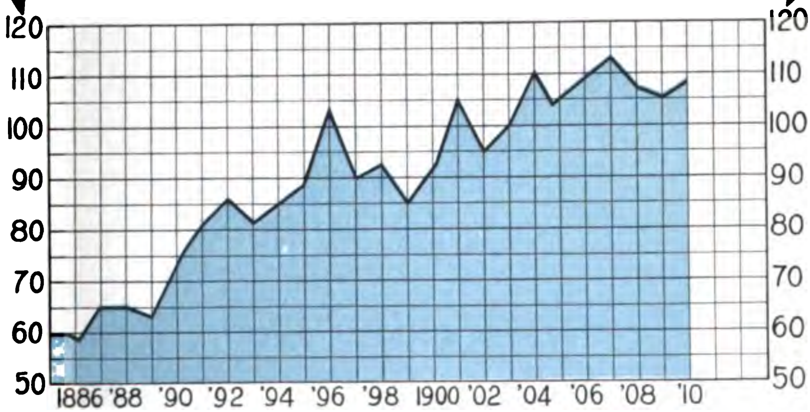
DISTRICTS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	6	10	7	11	7	14	8	13	13	10
Hudson Valley	5	2	3	8	9	5	4	3	4	7
Adirondack and Northern	15	5	3	1	11	3	2	1	4	12
Mohawk Valley	8	3	3	2	5	1	4	2	2	7
Southern Tier	5	5	2	9	2	1	4	2	2	5
East Central	13	2	5	4	4	3	1	4	6	5
West Central	6	3	3	3	4	3	2	2	1	4
Lake Ontario and Western	5	7	6	3	11	4	7	4	8	10
Entire State	6	8	9	10	8	10	7	8	9	9

Deaths from Violence

The reported mortality from Violence and deaths per 100,000 population due to accidents is shown by the following:

YEAR	Deaths from violence	Deaths per 100,000 population	YEAR	Deaths from violence	Deaths per 100,000 population
1885	2,994	53.3	1898	6,520	92.4
1886	3,296	57.6	1899	6,093	85.0
1887	3,780	64.7	1900	6,714	92.2
1888	3,842	64.6	1901	7,926	106.6
1889	3,834	63.2	1902	7,058	93.0
1890	4,542	73.4	1903	7,646	98.6
1891	5,028	79.6	1904	8,822	111.5
1892	5,543	86.1	1905	8,352	103.3
1893	5,295	80.9	1906	8,874	107.5
1894	5,487	82.7	1907	9,668	114.2
1895	5,889	87.3	1908	9,183	107.4
1896	7,022	102.6	1909	9,232	106.1
1897	6,172	88.7	1910	9,846	107.5

MORTALITY
FROM
VIOLENCE.
DEATHS PER 100,000 POPULATION
SINCE 1886.



NEW YORK STATE DEPARTMENT OF HEALTH

In each 1,000 deaths there were from Violence in the —

DISTRICTS	Decade, 1885–1894	Decade, 1895–1904	1905	1906	1907	1908	1909	1910
Maritime	39.0	57.7	53 5	63.1	66.4	69.0	65.4	64.5
Hudson Valley	40.7	49.3	64.6	58.3	60.3	61.9	70.0	74.1
Adirondack and Northern	36.7	46.2	52.3	56.1	54.0	60.4	53.7	58.3
Mohawk Valley	43.5	53.1	58.8	60.9	61.5	60.4	68.4	67.6
Southern Tier	51.0	55.5	67.0	59.4	63.3	62.7	66.9	70.6
East Central	44.0	50.0	54.5	60.9	63.7	62.1	61.5	67.8
West Central	44.5	51.7	58.0	63.6	63.3	64.1	65.8	65.7
Lake Ontario and Western	48.5	57.0	66.2	74.2	71.2	63.1	73.4	62.8
Entire State	40.3	55.8	61.0	63.2	65.3	66.1	65.8	65.0

In each 1,000 deaths there were from Diarrhea (under 2 years of age) in the —

DISTRICTS	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	56	93	85	75	76	83	74	79	81	69	74
Hudson Valley	68	40	42	35	36	43	35	20	43	35	39
Adirondack and Northern	72	41	33	38	23	43	34	35	45	39	40
Mohawk Valley	65	41	44	35	40	41	44	47	53	50	64
Southern Tier	55	30	34	35	23	29	37	25	34	22	32
East Central	68	31	33	28	20	32	36	37	41	35	44
West Central	57	28	35	26	26	35	36	22	30	26	33
Lake Ontario & Western	86	60	56	50	53	50	57	46	52	48	54
Entire State	62	72	67	60	60	65	61	63	66	56	61

In each 1,000 deaths there were from Pneumonia in the —

DISTRICTS	1903	1904	1905	1906	1907	1908	1909	1910
Maritime	89	110	125	137	78	64	70	72
Hudson Valley	70	78	75	79	77	65	70	67
Adirondack and Northern	57	60	66	74	81	60	71	64
Mohawk Valley	64	73	77	76	80	70	66	79
Southern Tier	55	70	70	60	71	61	60	65
East Central	64	83	75	61	66	56	70	69
West Central	60	72	70	65	65	57	56	57
Lake Ontario and Western	51	65	65	60	54	50	55	40
Entire State	80	95	104	109	75	62	67	67

As one of the representatives of the Department designated to attend the annual meeting of the American Public Health Association, held in Milwaukee, Wis., September 5–9, 1910, I respect-

fully report that I attended the sessions of the Section on Vital Statistics and took part in the program, which was as follows:

SEPTEMBER 6

Business meeting of the Section, followed by an address by the chairman.

Presentation of papers as follows:

1. "Registration of Births," by F. D. Beagle, Director Division Vital Statistics, New York State Department of Health, Albany, N. Y.

2. "Premature Still Births," by Dr. Jno. S. Fulton, Secretary General International Congress on Hygiene and Demography, Washington, D. C.

3. "The Importance of Birth Registration to Determine Infant Mortality," by Dr. J. H. Mason Knox, Jr., Physician in charge of the Thos. Wilson Sanitarium for Children, Baltimore, M. D.

4. "The Work of the Association for the Study and Prevention of Infant Mortality," by Dr. Marshall L. Price, Secretary State Board of Health, Baltimore, Md.

SEPTEMBER 7

5. "The Practical Side of Registration and the Obstacles Encountered in the Application of the Registration Laws in Nebraska," by Dr. E. Arthur Carr, Secretary State Board of Health, Lincoln, Neb.

6. "The Prevalence of Tuberculosis in European Immigrants to Canada," by Dr. P. H. Bryce, Chief Medical Director, Department of Interior, Ottawa, Canada.

7. "The Importance of the Registration of Marriage Certificates," by Dr. F. W. Shumway, Secretary State Board of Health, Lansing, Mich.

8. "Occupational Statistics for Tuberculosis in Wisconsin," by Mr. L. M. Hutchcroft, Statistician, State Bureau of Vital Statistics, Madison, Wis.

Respectfully submitted,

F. D. BEAGLE,

Chief Clerk and Director Division of Vital Statistics

SPECIAL REPORT ON VITAL STATISTICS

1900–1909

BY

Prof. Walter F. Willcox, Consulting Statistician

The table shows that the number of deaths in the last years was between 4½ and 6 per cent greater than the number in 1900. As the population of the State has been increasing more rapidly than this and in 1910 exceeded that in 1900 by more than one-fourth (25.4 per cent), it is clear that the ratio of deaths to living population has been falling.

The simplest and so the first mode of classifying these deaths is by *sex*. During the ten years the deaths of males were 730,114 and those of females 631,658, an excess of nearly 100,000, or 7.2 per cent, in male deaths. This is probably not due to any excess of males in the population of the State, for in 1900 and earlier females were more than half of the State's population. To determine whether the ratio of deaths of either sex to the total has undergone any change during the period, the deaths by sex for each year as well as for the two quinquennial periods are given below.

TABLE 2.— DEATHS IN NEW YORK STATE CLASSIFIED BY SEX, FOR EACH YEAR, 1900–1909, INCLUSIVE

YEAR	Total	Deaths		Per Cent		Excess of Male Deaths	
		Male	Female	Male	Female	Number	Per cent
1900........	132,352	69,687	62,665	52.7	47.3	7,022	5.4
1901........	131,461	70,070	61,391	53.3	46.7	8,679	6.6
1902........	124,657	66,841	57,816	53.6	46.4	9,025	7.2
1903........	127,602	68,030	59,572	53.3	46.7	8,458	6.6
1904........	142,014	75,985	66,029	53.5	46.5	9,956	7.0
1900–04....	658,086	350,613	307,473	53.3	46.7	43,140	6.6
1905........	137,222	73,432	63,790	53.5	46.5	9,642	7.0
1906........	140,626	75,990	64,636	54.0	46.0	11,354	8.0
1907........	146,882	79,922	66,960	54.4	45.6	12,962	8.8
1908........	138,883	74,691	64,192	53.8	46.2	10,499	7.6
1909........	140,073	75,466	64,607	53.9	46.1	10,859	7.8
1905–09....	703,686	379,501	324,185	53.9	46.1	55,316	7.8

In each of the ten years deaths of males outnumbered those of females by from seven to thirteen thousand and by 5 to 9 per cent. The excess of male deaths was greater absolutely and relatively toward the close of the decade. This may be due to an increasing proportion of males in the population (about that we are not yet informed) or to a fall in the death rate of females greater than the fall for males or to some combination of the two.

A classification almost as obvious as that by sex and exercising a greater influence upon death is the classification by *age*. The tabulations by age are for single years under five and by five year age periods above five. The deaths during this ten year period were distributed to the several ages as shown in Table 3.

TABLE 3.— DEATHS IN NEW YORK STATE DISTRIBUTED BY AGE FOR THE QUINQUENNIAL PERIODS 1900–1904 AND 1905–1909 AND FOR THE DECENNIAL PERIOD 1900–1909

AGE	1900–1909		1900–1904		1905–1909		Quinquennial change	
	Number	Ratio per 10,000	Number	Ratio per 10,000	Number	Ratio per 10,000	Decrease	Increase
Under 1	257,010	1,887	122,783	1,866	134,227	1,907	......	41
1	63,981	470	32,010	486	31,971	454	32	....
2	27,488	202	14,036	213	13,452	191	22	....
3	17,122	126	8,764	133	8,358	119	14	....
4	12,261	90	6,537	99	5,724	81	18	....
5–9	33,496	246	17,599	267	15,897	226	41	....
10–14	19,069	140	9,529	145	9,540	136	9	....
15–19	30,644	225	15,012	228	15,632	222	6	....
20–24	47,715	350	23,569	358	24,146	343	15	....
25–29	57,286	421	29,103	442	28,183	401	41	....
30–34	61,221	450	30,592	465	30,629	435	30	....
35–39	67,016	492	32,289	491	34,727	494	......	3
40–44	65,096	478	31,210	474	33,886	482	......	8
45–49	64,120	471	29,291	445	34,829	495	......	50
50–54	68,129	500	32,288	491	35,841	509	......	18
55–59	69,330	509	33,082	503	36,248	515	......	12
60–64	78,648	578	37,076	563	41,572	591	......	28
65–69	80,583	592	37,705	573	42,878	609	......	36
70–74	78,750	578	37,719	573	41,031	583	......	10
75–79	70,078	515	33,327	507	36,751	522	......	15
80–84	51,580	379	24,957	379	26,623	379	......	....
85–89	27,536	202	12,535	191	15,001	213	......	22
90–94	9,277	68	4,414	67	4,863	69	......	2
95 and over	2,638	19	1,239	19	1,399	20	......	1
Age unknown	1,698	12	1,420	22	278	4	18	....
Total	1,361,772	10,000	658,086	10,000	703,686	10,000	......	....

This shows that much the largest number of deaths, between one-fifth and one-sixth of the total, occur in the first year of life and that more deaths occur in each of the three following years than at any later year of age. After four is reached the annual number of deaths fall below that in and beyond middle life, 35 to 79 years of age, and continue to sink to a minimum at the age of puberty, when only about one three hundred and fiftieth of the total number of deaths occur in any one year of age. The largest number of deaths after the years of infancy are passed

occur at the ages 65 to 69, when about one eighty-fifth of the total deaths occur in any one year of age. A rough distribution of the total deaths to age periods has been made and shows that each five deaths in the State on the average occur within the following limits of age:

One between birth and the age of 1 year, 3 months — interval 15 months.
One between 1 year, 3 months and 27 years, 2 months — interval 311 months.
One between 27 years, 2 months and 48 years, 6 months — interval 256 months.
One between 48 years, 6 months and 65 years, 1 month — interval 199 months.
One between 65 years, 1 month and limit of life.

The interval requisite to result in one-fifth of all the deaths is least in infancy and, as the oldest person to die among the 1,361,772 was probably more than 100, it is greatest in old age. A second maximum is found in youth and early adult life, after which the interval diminishes because the increasing danger of death more than counterbalances the diminishing number exposed to it.

Table 3 in showing the distribution of deaths by age for each quinquennial period reveals the fact that deaths under 1 and deaths over 35 years of age were a larger proportion and deaths between 1 and 34, inclusive, were a smaller proportion in the second five years. Failures to report ages have decreased and their number is now insignificant. These changes in distribution are summarized below:

AGE PERIOD	Proportion of Deaths in		Increase (+) or decrease (—)
	1900–04	1905–09	
Under 1	1,866	1,907	+41
1-34	2,836	2,608	—228
35 and over	5,276	5,481	+205
Unknown	22	4	—18
Total	10,000	10,000	....

The decrease in the proportion of deaths at ages of 1 to 34 and at unknown ages and the increase in the proportion at ages of 35 and over are just what would be expected. But it is surprising to find an increase in the proportion of infantile deaths. In previous

reports reasons have been given for believing that in the State outside of New York City the unrecorded deaths are still numerous, but less so now than in 1900. Omission of infantile deaths is more common than omission of deaths at other ages. This seeming increase of infantile mortality may then be due, at least in part, to an improvement of the records. To test this conjecture, the total has been broken into two parts, one for New York City, where the omissions in 1900 and since were probably very few, and the other for the rest of the State, where omissions were more common.

AGE PERIOD	PROPORTION OF DEATHS IN					
	NEW YORK CITY			REST OF STATE		
	1900–04	1905–09	Increase (+) or decrease (—)	1900–04	1905–09	Increase (+) or decrease (—)
Under 1	2,198	2,208	+10	1,475	1,562	+87
1 to 34	3,309	3,047	—262	2,284	2,105	—179
35 and over	4,490	4,744	+254	6,197	6,325	+128
Unknown age	3	1	—2	44	8	—36
Total	10,000	10,000	....	10,000	10,000	....

The table shows that ages have been reported much more uniformly in New York City where the age return is lacking on only one certificate in 10,000. The proportion in the rest of the State is now eight times that and in the first five year period the difference was even wider. In the city the proportion of infantile deaths to the total has changed very little, but in the rest of the State it has noticeably increased. This supports but is far from proving the conjecture that much of the apparent increase in the proportion of infantile deaths is due to more accurate returns.

The table gives no ground for concluding that infant mortality in New York City is greater than in the rest of the State. To determine that, the living population under one year of age, or better yet, if possible, the annual number of living births is needed. This point must be passed by for the present with a caution against such a misinterpretation of the figures.

The mass of deaths may next be analyzed by *sex* and *age* combined, as in Table 4.

TABLE 4.— DEATHS IN NEW YORK STATE CLASSIFIED BY SEX AND AGE, 1900–1909, INCLUSIVE

AGE	Total	Male	Female	Excess of Deaths Among —		Male deaths to 1,000 female
				Males	Females	
Under 1	257,010	142,223	114,787	27,436	....	1,239
1	63,981	33,933	30,048	3,885	....	1,129
2	27,488	14,543	12,945	1,598	....	1,124
3	17,122	8,901	8,221	680	....	1,083
4	12,261	6,303	5,958	345	....	1,058
5–9	33,496	17,367	16,129	1,238	....	1,077
10–14	19,069	9,775	9,294	481	....	1,073
15–19	30,644	15,864	14,780	1,084	....	1,052
20–24	47,715	24,959	22,756	2,203	....	1,097
25–29	57,286	30,628	26,658	3,970	....	1,149
30–34	61,221	34,599	26,622	7,977	....	1,300
35–39	67,016	39,078	27,938	11,140	....	1,399
40–44	65,096	38,590	26,506	12,084	....	1,456
45–49	64,120	37,655	26,465	11,190	....	1,423
50–54	68,129	38,481	29,648	8,833	....	1,298
55–59	69,330	37,915	31,415	6,500	....	1,207
60–64	78,648	41,159	37,489	3,670	....	1,098
65–69	80,583	41,408	39,175	2,233	....	1,057
70–74	78,750	39,414	39,336	78	....	1,002
75–79	70,078	34,343	35,735	....	1,392	961
80–84	51,580	24,575	27,005	....	2,430	910
85–89	27,536	12,564	14,972	....	2,408	839
90–94	9,277	3,729	5,548	....	1,819	672
95 +	2,638	950	1,688	....	738	563
Unknown	1,698	1,158	540	618	....	2,145
Total	1,361,772	730,114	631,658	98,456	....	1,156

An excess of male deaths is found at every age under 75 and of female deaths at every age over 75. This is probably not due to an excess of males in the living population, for in 1900 such excess of males was reported by the census only at ages below 15 (except 8 and 13) and between 29 and 56, inclusive (except 50, 54 and 55).[1] At 63 of the 105 different age periods included in the census table the female population of the State was more numerous than the male. The excess of male deaths between 30 and 54 and of female deaths at ages above 75 must be due at least in part to the larger number exposed to die. But the excess of male deaths between 15 and 30 and between 55 and 75 cannot be so accounted for and must be due to a greater male death rate.

[1] Twelfth census, volume 2, pages 72, 73.

Much the largest part, nearly 28 per cent, of the net excess of male deaths is found in infancy, the deaths of males under one year of age exceeding those of females by 24 per cent. As the births of males exceed those of females by only 5 or 6 per cent and the male children under 1 living in the State in 1900 exceeded the female by only 2 per cent, the difference between these ratios is an evidence of the much greater mortality of male infants.

A table similar to Table 3 but including also the sex classification has been prepared, but it adds so little that it does not deserve insertion. It does show that the increase in the proportion of female infant deaths between the two periods, 1900–04 and 1905–09, was 2½ times the increase in the proportion of male infant deaths. If this be due in part to improvement of the records, as has been conjectured, it would seem to follow that during the five years, 1900–1904, the deaths of female infants were more likely to escape registration than the deaths of male infants.

The State contains so small proportions of races other than white that little need be said regarding deaths by *race*. The following summary shows the general results.

DEATHS IN NEW YORK STATE CLASSIFIED BY RACE, 1900–1909, INCLUSIVE

RACE	1900–04	1905–09	1900–09
White	642,794	686,701	1,329,495
Negro	14,477	16,245	30,722
Indian	251	238	489
Mongolian	564	502	1,066
Total	658,086	703,686	1,361,772

Reported deaths of Indians and Mongolians have decreased in actual numbers and still more in proportions. That the reported deaths of Negroes have increased more rapidly than total deaths is shown by the fact that of each 10,000 deaths Negro deaths constituted 220 in 1900–04 and 231 in 1905–09. Whether these changes are due to a decrease in the number of Indians and Mongolians in the State and an increase in the proportion of Negroes to total population only the unpublished figures of the census of 1910 can determine.

Because of the much greater numbers involved, the classification of deaths among the white population by *nativity* is far more important than the classification of total deaths by race.

From this point of view the deaths are classified as follows:

NUMBER AND PER CENT OF ALL DEATHS OF WHITES IN NEW YORK STATE

NATIVITY	Number 1900–1904	Per cent	Number 1905–1909	Per cent.
Native white	436,087	67.8	463,512	67.5
Of native parents	193,639	30.1	203,413	29.6 ....
One or both parents foreignborn	191,602	29.8	218,087	31.8 ....
Parents' country of birth unknown	50,846	7.9	42,012	6.1 ....
Foreign-born white	197,098	30.7	216,591	31.5
Country of birth unknown	9,609	1.5	6,598	1.0
Total white	642,794	100.0	686,701	100.0

About two-thirds of the decedents in the State are of native birth and less than one-third are of foreign birth. Here, too, evidence of improvement in the records is apparent. The proportion of decedents whose country of birth was unknown fell from 1.5 per cent in 1900–1904 to 1.0 per cent in 1905–09 and the proportion of decedents the birthplace of whose parents was unknown fell from 7.9 per cent in 1900–04 to 6.1 per cent in 1905–09. As these changes tend to obscure the changes in the other classes a second computation has been made after subtracting all decedents whose birthplace or parents' birthplace was unknown. The result is as follows:

NUMBER AND PER CENT OF WHITE DECEDENTS WITH BIRTHPLACE AND PARENTS' BIRTHPLACE STATED

NATIVITY	Number 1900–1904	Per cent	Number 1905–1909	Per cent	Increase (+) or decrease (—)
Native:	385,241	66.2	421,500	66.1	—.1
Of native parents	193,639	33.3	203,413	31.9	—1.4 ....
Of foreign-born parents	191,602	32.9	218,087	34.2	+1.3 ....
Foreign-born	197,098	33.8	216,591	33.9	+.1
Total with birthplace and parents' birthplace stated	582,339	100.0	638,091	100.0	....

The marked decrease in native decedents born of native parents is almost counterbalanced by the increase in native decedents born of foreign-born parents, the increase in the proportion of deaths among the foreign-born population being very slight.

The deaths are also classified by reported *cause*. The numerous causes are tabulated under 189 heads and these are combined into 14 main groups. These groups may be divided into two classes, those in which the proportion of deaths to the total tended to decrease between 1900 and 1909 and those in which the proportion tended to increase. Eight groups, as given below, showed an increase and six a decrease. This does not imply any increase in the mortality from these eight groups compared with the population, but merely that they are causing a larger proportion of such deaths as occur.

TABLE 5.— RATIO OF DEATHS IN NEW YORK STATE FROM SPECIFIED GROUPS OF CAUSES TO 10,000 DEATHS FROM ALL CAUSES FOR EACH YEAR, 1900–1909, INCLUSIVE

Groups causing an increasing proportion of deaths

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1900–1904	1905–1909
Diseases of circulatory system	858	903	1,015	1,059	1,090	1,113	1,139	1,219	1,264	1,331	985	1,213
Diseases of digestive system	1,328	1,230	1,188	1,122	1,170	1,246	1,262	1,233	1,278	1,179	1,208	1,239
Diseases of genito-urinary system	744	783	835	873	849	869	877	898	878	920	817	888
Child-birth	77	85	83	85	89	99	94	99	98	95	84	97
Diseases of locomotor system	14	18	19	22	18	20	20	18	22	23	18	21
Malformations	67	68	73	78	78	85	93	96	94	97	73	93
Early infancy	381	345	371	390	367	403	420	416	440	423	371	421
Violence	522	636	597	657	683	674	693	691	696	687	620	688
Total	3,991	4,068	4,181	4,285	4,344	4,509	4,598	4,670	4,770	4,755	4,176	4,660

Groups causing a decreasing proportion of deaths

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1900–1904	1905–1909
General diseases	2,656	2,790	2,661	2,676	2,570	2,542	2,570	2,609	2,696	2,632	2,668	2,610
Diseases of nervous system	1,093	1,064	1,086	1,044	1,079	1,144	1,007	962	935	913	1,073	991
Diseases of respiratory system	1,639	1,541	1,564	1,513	1,578	1,389	1,418	1,476	1,307	1,449	1,568	1,409
Diseases of skin	44	46	42	46	43	42	41	37	35	36	44	39
Old age	266	257	250	228	196	192	201	147	149	128	239	163
Ill-defined causes	311	234	216	208	190	182	165	99	108	87	232	128
Total	6,009	5,932	5,819	5,715	5,656	5,491	5,402	5,330	5,230	5,245	5,824	5,340

The noteworthy fact revealed by Table 5 is the marked increase in the proportion of deaths from diseases of the circulatory system. Each year showed a larger proportion than any preceding. The total increase in these eight groups of causes between 1900 and 1909 was 764 per 10,000. The increase from diseases of the circulatory system alone was 473 per 100,000, or more than three-fifths (61.9 per cent) of the increase from all eight groups of causes. At the same time there has been a marked decrease in the proportion of deaths from "ill-defined causes" pointing to an improved detail and accuracy of diagnosis. As "heart failure" is one of the group of ill-defined causes, it may well be that part of the increase in deaths from diseases of the circulatory system is due to an improved diagnosis. But even if all the decrease in the proportion of deaths from ill-defined causes were ascribed to a transfer from that group to the group of diseases of the circulatory system, this would not account for one-half of the apparent increase in the latter. The conclusion that a rapidly increasing proportion of the deaths in New York State are due to diseases of the circulatory system seems well established by the evidence.

The figures have been analyzed for New York City and the rest of the State with the following result.

YEAR	PER CENT OF DEATHS FROM ALL CAUSES DUE TO —			
	DISEASES OF CIRCULATORY SYSTEM		ILL-DEFINED CAUSES	
	New York city.	Rest of State	New York city	Rest of State
1900	7.2	10.2	2.2	4 2
1901	7.5	10.9	2.3	2.7
1902	8.4	12.3	1.8	2.6
1903	8.8	12.6	1.9	2.3
1904	8.9	13.4	1.5	2.3
1905	9.4	13.1	1.6	2.1
1906	9.7	13.5	1.4	2 0
1907	10.1	14.7	0.9	1.1
1908	10.5	15.0	1.0	1.2
1909	11.1	15.8	0.8	1.0
Change	+3.9	+5.6	—1.4	—3.2

The proportion of deaths from diseases of the circulatory system in New York City is much smaller than the proportion in the rest of the State. The main reason no doubt is that these are diseases characteristic of old age and the proportion of aged persons in New York City is much less than in the rest of the State. The increase in the proportion of deaths from these diseases in New York City has been not much more than two-thirds of the increase in the rest of the State. Probably this is connected with the fact that the decrease in the proportion of deaths from ill-defined causes has been less than half as great in New York City as in the rest of the State.

The fact that the average age at death is steadily and rapidly rising is closely connected with the increasing prevalence of death from diseases characteristic of old age, like those of the circulatory system. The common saying that a man is as old as his arteries illustrates this connection. No doubt the increasing age at death is an important element in explaining the increasing prevalence of these diseases. If it were the sole cause we should expect to find that when deaths are classified by the age of the decedent the proportion of deaths, for example, between 50 and 59 years of age which were due to diseases of the circulatory system was not greater or not materially greater in 1909 than in 1900. The following table shows the facts on this point. As these diseases are not common in early life, the table begins with the age of 30.

TABLE 6.— NUMBER OF DEATHS FROM DISEASES OF CIRCULATORY SYSTEM CLASSIFIED BY AGE AND PROPORTION TO DEATHS FROM ALL CAUSES, 1900 AND 1909

AGE	DEATHS FROM ALL CAUSES		DEATHS FROM DISEASES OF CIRCULATORY SYSTEM		PER CENT THAT DEATHS FROM DISEASES OF CIRCULATORY SYSTEM MAKE OF DEATHS FROM ALL CAUSES	
	1900	1909	1900	1909	1900	1909
30-39	12,383	12,656	921	1,167	7.4	9.2
40-49	11,694	13,823	1,187	1,766	10.2	12.8
50-59	12,529	14,553	1,811	2,667	14.5	18.3
60-69	14,067	17,412	2,392	4,248	17.0	24.4
70-79	13,839	15,972	2,365	4,442	17.1	27.8
80-89	7,187	8,323	875	2,259	12.2	27.1
90 +	1,095	1,334	76	297	6.9	22.3

Of all persons dying in New York State at ages above 60 more than one-fourth die of diseases of the circulatory system. The proportion of deaths ascribed to this group of causes at each age period was considerably greater in 1909 than in 1900. Hence the increase is not adequately explained by the increasing length of life alone or by the increasing accuracy of diagnosis alone or by these two coöperating causes.

Is there any difference between New York City and the rest of the State in the proportion of deaths at a given age period due to diseases of the circulatory system? As these are diseases of old age the following table designed to answer the question begins with the age of 50.

PER CENT THAT DEATHS FROM DISEASES OF THE CIRCULATORY SYSTEM CONSTITUTE OF DEATHS FROM ALL CAUSES, 1900 AND 1909

AGE	IN NEW YORK CITY		IN REST OF STATE	
	1900	1909	1900	1909
50–59	13.5	17.7	15.6	19.0
60–69	16.0	22.7	17.8	25.9
70–79	15.5	26.0	17.9	28.8
80+	10.6	27.7	11.8	26.1

The real increase in the mortality from these diseases during the decade has been much exaggerated by the transfer of deaths from old age and from ill-defined causes to this group. The figures indicate that deaths from diseases of the circulatory system are a smaller proportion of all deaths in New York City than in other parts of the State.

Table 5 on page 219 shows that the general diseases as distinguished from localized diseases, or diseases attacking some particular system of the body, cause more than one-fourth of all the deaths in New York State and almost twice the number ascribed to any other group. The group of general diseases, therefore, deserves special attention and a more detailed analysis. The eight general diseases each causing more than one thousands deaths annually have been selected and analyzed in Table 7 in the effort to determine both their comparative importance and their increase or decrease within the decade.

TABLE 7.—RATIO OF DEATHS FROM MAIN KINDS OF GENERAL DISEASES TO 10,000 DEATHS FROM ALL CAUSES IN NEW YORK STATE FOR EACH YEAR, 1900 to 1909, INCLUSIVE

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1900–1904	1905–1909	1900–1909
Tuberculosis...	1,177	1,193	1,163	1,192	1,140	1,164	1,174	1,134	1,198	1,159	1,173	1,166	1,169
Cancer.......	366	394	418	434	411	448	446	450	490	519	405	471	438
Diphtheria and croup.......	249	228	230	231	212	164	191	174	174	165	230	174	202
Typhoid fever..	151	141	141	135	119	117	113	116	101	95	137	108	123
Influenza......	108	201	57	105	123	93	53	150	107	67	119	94	106
Diabetes......	62	72	74	82	86	91	94	97	102	108	75	98	87
Scarlet fever...	54	112	100	88	88	57	54	74	126	88	88	80	84
Measles.......	89	56	69	52	80	65	89	66	83	93	69	79	74
Other general diseases.....	399	394	408	357	311	343	356	348	314	339	374	340	357
Total.....	2,655	2,791	2,660	2,676	2,570	2,542	2,570	2,609	2,695	2,633	2,670	2,610	2,640

Table 7 shows that typhoid fever is the only general disease the relative importance of which has steadily and rapidly decreased through the decade. In 1900 it caused 1.5 per cent of the deaths in the State and in 1909 less than 1.0 per cent. Diphtheria and croup were at the maximum in 1900 and very close to the minimum in 1909, but the course during the intervening period was one of less steady decrease. Still the decrease in the prevalence of diphtheria and croup as shown by comparing the two five-year averages has been a little more rapid than the decrease of typhoid fever. Influenza has undergone even wider fluctuations but in the second five years, like typhoid fever and diphtheria and croup, it was responsible for only about three-fourths of the proportion of deaths which it caused in the first five years.

Tuberculosis, the most deadly general disease, unlike the foregoing, has shown no regular and important change but rather a zigzag movement well illustrated by the fact that the smallest and the largest proportion of deaths occurred in successive years, 1907 and 1908, and that the five-year averages show very little change. This does not mean that tuberculosis carries off as large a proportion of the population as formerly. It does mean that deaths from tuberculosis and deaths from all causes, if they have changed at all in rate or ratio to the population, have changed in the same direction and to much the same degree.

This unchanging proportion of deaths due to tuberculosis may be due in part to a more discriminating and conscientious diagnosis. Various pieces of evidence, some of which have been mentioned, concur to support the conclusion that the medical profession is certifying the cause of death more carefully and more accurately. Changes of this sort would probably reduce the proportion of undetected cases of tuberculosis. When the deaths are divided into those in New York City and those in the rest of the State no noteworthy difference appears in the trend of deaths from tuberculosis. The proportion of deaths from tuberculosis to deaths from all causes is greater in New York City than in the rest of the State, but this may be due to the larger proportion of young adults in the city and the large proportion of deaths from tuberculosis at that age. Neither in the city nor in the rest of the State has the proportion of deaths due to this cause undergone any steady and material reduction during the decade 1900 to 1909. We may hope that the next decade will show different results.

Monthly Distribution of Deaths

A study has been made of the distribution of deaths through the months of each year in the ten-year period. This, like the foregoing analysis, can be made without constant reference to the population. The number of deaths in each month has been divided by the number of days in that month to obtain the daily average. In a similar way the daily average for the entire year is computed and on dividing the daily average for each month by the daily average for the year a series of twelve quotients is reached, each of which is not very far from 100 and indicates the proportion between the mortality of that month and that of the year.

The average results for the ten years are as follows:

TABLE 8.—MONTHLY DISTRIBUTION OF DEATHS IN NEW YORK STATE, 1900–1909

	Ratio of daily mortality in months to daily mortality of year
January	105
February	112
March	112
April	109
May	98
June	90
July	103
August	101
September	95
October	89
November	89
December	97
Total	1200

The table shows six healthy and six unhealthy months. If the results are grouped by seasons they are:

Winter	105
Spring	106
Summer	98
Fall	91
Total	400

This shows that in New York State on the average of the last ten years spring is the most unhealthy season of the year and fall the most healthy. Winter is almost as unhealthy as spring and summer is a healthy rather than an unhealthy season.

Returning now to the preceding table, it may be noticed that there are two healthy periods, one of four months, the other of two, and that the unhealthy periods are similarly divided. Stated briefly, the first four months of the year are unhealthy with the maximum mortality in February and March; the last four months

are healthy with the minimum in October and November; of the middle four months the first two are healthy, the second two unhealthy. An earlier study of this subject for the years 1894–1898 has been brought into connection with the present by computing the distribution for the separating year 1899, thus yielding a total period of sixteen consecutive years for which the preceding statements hold true. One important difference appears. In the six-year period 1894–99, July (116) was the unhealthiest month and August (107) was almost as unhealthy as February (108). This suggests either that the years 1894–99 were characterized by abnormally high summer mortality or that since 1894 there has been an increased control of summer deaths. The following figures showing the relative mortality of July in each of the sixteen years test the accuracy of the conjecture.

Year	Ratio of daily mortality in July to daily mortality of year
1894	125
1895	113
1896	124
1897	113
1898	111
1899	109
1900	107
1901	111
1902	104
1903	103
1904	101
1905	111
1906	100
1907	97
1908	101
1909	98

The first three years include the two with the highest July mortality; the last three years include the two with the lowest July mortality and throughout the period the tendency to a reduced July mortality is clear and unmistakable. The change in the August mortality has been in the same direction. The average for 1894–99 was 107; that for 1900–09 was 101. Apparently the

reduction in summer mortality has progressed so rapidly since 1894 that the midsummer months are no longer the unhealthiest of the year. This subject deserves further study in order to determine whether similar changes have occurred in other states or countries. In Europe as a rule the winter months from December to March, inclusive, have the highest mortality and in countries, like Italy and Spain, in which the summer mortality is high it has apparently decreased of recent years just as it has in New York.

The detailed figures for each of the sixteen years 1894–1909 with the averages for 1894–99 and 1900–09 are given below:

TABLE 9.—MONTHLY DISTRIBUTION OF DEATHS IN NEW YORK STATE, 1894–1909, INCLUSIVE

MONTH	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1894–99	1900–09
January	109	106	99	96	94	120	97	115	105	104	104	103	100	109	111	100	104	105
February	104	115	103	110	99	115	111	112	113	112	115	113	106	117	115	104	108	112
March	102	110	108	116	100	107	121	110	105	111	120	113	108	110	109	110	107	112
April	102	105	106	107	101	104	120	104	106	106	118	109	107	103	108	112	104	109
May	92	92	93	93	95	92	101	93	101	99	102	95	100	95	99	102	93	98
June	101	87	95	94	87	94	88	90	94	89	93	89	89	89	86	92	93	90
July	125	113	124	113	111	109	107	111	104	103	101	111	100	97	101	95	116	103
August	103	107	122	101	110	97	101	101	102	97	93	101	105	107	101	98	107	101
September	98	100	96	100	116	92	97	96	95	91	88	94	101	96	95	95	100	95
October	90	90	85	91	94	90	87	87	89	90	82	86	94	90	91	93	90	89
November	84	84	80	87	87	85	82	88	89	95	87	91	90	88	91	94	84	89
December	90	91	89	92	106	95	88	93	97	103	97	95	100	99	93	105	94	97

Similar tables have been prepared for New York City and for the rest of the State for each of the ten years 1900–09 and for the entire period. The general results are as follows:

MONTH	RATES OF DAILY MORTALITY (1900–1909) IN MONTHS SPECIFIED TO THAT OF THE YEAR (=100)	
	New York City	Rest of State
January	105	104
February	110	113
March	111	113
April	110	109
May	98	99
June	93	87
July	111	93
August	99	103
September	90	100
October	86	92
November	89	91
December	98	96

The preceding figures show that on the average June and especially July in New York City are much more unhealthy than the same months are in the rest of the State, but that August, October and especially September in New York City are much more healthy than the same months are in the rest of the State. In the other seven months the differences between city and country are very slight. Apparently in the country the heat of summer takes a longer time to cause death than it does in the great city.

When the figures for July are analyzed by successive years for New York City and the rest of the State, it appears that in both areas the July maximum diminished between 1900 and 1909, but the decrease in New York City was much greater than in the rest of the State.

Analysis of Mortality Rates

From the United States census population figures for 1900, those of the State census for 1905 and those for 1910 published thus far by the Census Bureau it has been possible to estimate the population of the State on July 1st of those years and of each intervening year. This has been done by the arithmetical method used in previous reports. Similar figures have been computed also for all incorporated places having at least 10,000 inhabitants in 1910 and included in the Federal Mortality Reports for the entire period, 1900–1909. The word *urban* as used throughout this analysis is to be understood in this sense. Similar computations have been made for each county and sanitary district.

The population estimates for the entire State and for the urban and rural districts are given below.

TABLE 10.— ESTIMATED POPULATION OF NEW YORK STATE AND ITS URBAN AND RURAL DISTRICTS, JULY 1, 1900–JULY 1, 1910

YEAR	New York State	Urban	Rural
1900	7,282,217	4,899,406	2,382,811
1901	7,441,886	5,049,689	2,392,197
1902	7,601,574	5,199,981	2,401,593
1903	7,761,257	5,350,281	2,410,976
1904	7,920,940	5,500,576	2,420,364
1905	8,085,190	5,654,972	2,430,218
1906	8,299,732	5,854,523	2,445,209
1907	8,514,289	6,054,074	2,460,215
1908	8,728,843	6,253,634	2,475,209
1909	8,943,403	6,453,196	2,490,207
1910	9,157,963	6,652,772	2,505,191

By the use of these more accurate estimates it is possible to obtain more trustworthy birth, death and marriage rates for the decade than was possible before the census figures for 1910 were available. Table 11 shows the main statistical results of registration in the State since 1885.

TABLE 11.— POPULATION, BIRTHS, DEATHS, STILLBIRTHS, MARRIAGES AND DIVORCES IN NEW YORK STATE, 1885–1910

YEAR	Estimated population	Births, excluding still-births, according to State Department of Health	DEATHS, EXCLUDING STILL-BIRTHS, ACCORDING TO—		Still-births, according to State Department of Health	MARRIAGES, ACCORDING TO—	
			State Department of Health	Census Bureau		State Department of Health	Census Bureau
1885	5,609,910	63,536	80,407	....	....	24,409	....
1886	5,719,855	89,828	86,801	....	....	36,764	....
1887	5,831,947	102,038	108,269	....	....	44,438	44,542
1888	5,946,246	103,089	114,584	....	....	43,683	44,645
1889	6,062,764	114,804	113,155	....	....	50,969	49,997
1890	6,182,600	112,572	128,648	....	....	41,195	49,201
1891	6,316,333	125,909	129,850	....	....	51,458	51,277
1892	6,438,283	130,143	131,388	....	....	52,725	52,798
1893	6,537,716	136,297	129,659	....	....	52,805	52,999
1894	6,638,696	141,827	123,423	....	....	52,539	52,621
1895	6,741,246	142,311	128,834	....	....	59,059	58,889
1896	6,845,375	147,327	126,253	....	....	58,990	59,189
1897	6,951,111	144,631	118,525	....	....	57,530	57,025
1898	7,085,459	138,702	122,584	....	....	57,392	57,165
1899	7,167,491	136,778	121,831	....	....	61,167	59,907
1900	7,282,217	143,156	132,089	132,352	....	63,225	63,743
1901	7,441,886	140,539	131,335	131,461	....	65,216	65,158
1902	7,601,574	146,740	124,830	124,651	....	68,903	69,439
1903	7,761,257	158,343	127,498	127,602	....	73,011	73,338
1904	7,920,940	165,014	142,217	142,014	....	74,677	74,581
1905	8,085,190	172,259	137,433	137,222	....	78,261	80,162
1906	8,299,732	183,012	141,099	140,626	9,401	87,870	88,979
1907	8,514,289	196,020	147,130	146,882	10,261	95,215	....
1908	8,728,843	203,159	138,912	138,883	10,291	72,286	....
1909	8,943,403	202,656	140,261	140,073	10,069	78,363	....
1910	9,157,963	213,290	147,629	....	9,952	84,543	....

TABLE 11.— *Continued*

POPULATION, BIRTHS, DEATHS, STILLBIRTHS, MARRIAGES AND DIVORCES IN NEW YORK STATE, 1885–1910

YEAR	Divorces, according to Census Bureau	Births per 1,000 population	Deaths per 1,000 population	Persons married per 1,000 population	Persons divorced per 100,000 population
1885	936	11.3	14.3	8.8	33
1886	1,006	15.7	15.2	12.8	35
1887	1,042	17.5	18.6	15.2	36
1888	1,034	17.3	19.3	14.6	36
1889	1,095	18.8	18.6	16.8	36
1890	901	18.2	20.8	13.4	29
1891	1,052	19.9	20.5	16.2	33
1892	1,155	20.2	20.3	16.2	36
1893	1,175	20.8	19.7	16.2	36
1894	1,386	21.4	18.6	15.8	42
1895	1,434	21.1	19.1	17.4	42
1896	1,270	21.5	18.4	17.2	37
1897	1,324	20.8	17.1	16.6	38
1898	1,493	19.7	17.4	16.2	42
1899	1,690	19.1	17.0	17.0	47
1900	1,800	19.7	18.1	17.4	49
1901	1,832	18.9	17.7	17.5	49
1902	1,533	19.3	16.4	18.1	40
1903	1,774	20.4	16.4	18.8	46
1904	1,952	20.8	18.0	18.8	49
1905	2,144	21.3	17.0	19.4	53
1906	2,069	22.1	17.0	21.2	50
1907	....	23.0	17.3	22.4	....
1908	....	23.3	15.9	16.6	....
1909	....	23.7	15.7	17.5	....
1910	....	23.3	16.1	18.5	....

It is interesting to note that, although the population estimates for the years 1905–1909, inclusive, are somewhat altered through the use of the 1910 figures, the rates do not show any material differences from those given in my report for last year.[1] The revised figures confirm and emphasize the statement then made that "1909 stands at the high water mark of public health in the history of New York State.[2]

In Table 12 are given the death rates from all causes for the State and sanitary districts during the last decade.

[1] State Department of Health, 30th Annual Report, Vol. 1, p. 239.
[2] Ibid, p. 241.

TABLE 12.— DEATH RATES OF NEW YORK STATE AND OF THE SANITARY DISTRICTS, 1900–1909, INCLUSIVE

YEAR	State	Adirondack & Northern	Lake Ontario & Western	Mohawk Valley	West Central	East Central	Southern Tier	Hudson Valley	Maritime
1900.....	18.2	15.7	14.9	16.1	15.4	15.6	15.0	18.6	20.2
1901.....	17.7	15.0	14.9	15.9	15.3	15.3	14.3	17.8	19.5
1902.....	16.4	13.1	13.9	14.5	14.5	13.8	13.7	16.1	18.2
1903.....	16.4	13.5	15.0	15.5	15.5	14.3	13.9	16.9	17.6
1904.....	17.9	14.3	15.2	15.6	15.7	15.6	15.6	17.8	19.7
1905.....	17.0	14.8	15.2	15.1	16.0	15.7	14.6	17.6	18.1
1906.....	16.9	14.9	15.3	15.8	15.5	15.2	14.4	16.9	18.1
1907.....	17.2	15.0	15.9	16.4	16.1	15.8	15.4	17.9	18.1
1908.....	15.9	14.8	14.6	15.9	15.2	16.1	15.5	17.1	16.2
1909.....	15.7	15.1	14.7	14.7	15.1	15.3	15.3	16.9	15.9

The table indicates that the mortality from all causes has decreased during the decade, but not uninterruptedly. At no time since 1900 has the rate risen as high as in that year (18.2). A study of the rates according to sanitary districts indicates that the same is true of the Hudson Valley and Maritime districts, that the high rate in the State in 1900 was due to excessive rates in those two districts and that the general decline in the State is largely due to the improvement in the same districts.

Although for the State as a whole 1909 was the healthiest year, yet for every sanitary district, except the Maritime, 1902 shows the minimum rate, the decrease from 1901 ranging from .6 to 1.9 per thousand and in five of the seven sanitary districts being 1.0 or above. These minima seemed so notable as to make a brief study of the deaths by cause for 1902 worth while. Below are given the deaths in 1901 and 1902 from all causes and from each cause showing a difference between the two years of at least 200 deaths.

TABLE 13.—DEATHS IN NEW YORK STATE IN 1901 AND 1902 FROM PRINCIPAL CAUSES

CAUSE	Deaths 1901	Deaths 1902	Excess (+ or decrease (—) in 1902
All causes	131,461	124,657	—6,804
Scarlet fever	1,469	1,249	—220
Whooping cough	633	900	+267
Influenza	2,643	713	—1,930
Tuberculosis of lungs	13,877	12,657	—1,220
Meningitis	2,328	2,092	—236
Other diseases of the nervous system	11,654	11,438	—216
Diseases of circulatory system	11,871	12,649	+778
Pneumonia	11,400	10,303	—1,097
Other diseases of the respiratory system	8,850	9,194	+344
Diarrhea and enteritis under 2 years	8,053	7,016	—1,037
Violence other than suicide	7,557	6,546	—1,011
Ill-defined causes	3,030	2,622	—408

It will be seen that the decrease of 6,804 deaths in 1902 was largely due to fewer deaths from the following causes: Influenza, tuberculosis of the lungs, pneumonia, diarrhea and enteritis under two years and violence other than suicide. An investigation of this last class reveals the fact that the decrease is due to a decline in deaths from heat and sunstroke (from 1,465 in 1901 to 46 in 1902), a decrease so great as to more than account for that in the whole class and so offset the increase in other forms of violence to be expected with the growth in population. The character of the five causes noted above, which account for 6,295 of the 6,804 fewer deaths, points to climatic conditions peculiarly favorable to health in 1902.

The year 1907 shows a high death rate, the highest in the decade for three districts (Lake Ontario and Western, Mohawk Valley and West Central) and an increase over several preceding years for the State as a whole and for every other district, except the Maritime where it was the same as for the two preceding years. To throw light on the reasons for this high rate, the deaths from the principal causes in 1907 were compared with the average in 1906 and 1908. Table 14 indicates the results for causes showing significant differences.

TABLE 14.— DEATHS IN NEW YORK STATE FROM THE PRINCIPAL CAUSES, 1907 AND AVERAGE OF 1906 AND 1908

CAUSE	Average number deaths 1906 and 1908.	Number deaths 1907	Excess (+) or decrease (—) in 1907.
All causes	139,755	146,882	+7,127
Influenza	1,118	2,204	+1,086
Nervous diseases other than meningitis	11,683	12,107	+424
Diseases of the circulatory system	16,781	17,902	+1,121
Pneumonia	9,4 0	11,136	+1,646
Other diseases of the respiratory system	9,552	10,539	+987
Diarrhea and enteritis under 2 years	9,453	9,827	+374
Bright's disease and nephritis	10,821	11,675	+854
Violence other than suicide	8,296	8,872	+576
Ill-defined causes	1,882	1,455	—427

Some increase in the number of deaths was to be expected with the growth of population and the improvement in registration, but these factors seemed insufficient to account entirely for an increase of more than 7,000. The causes which suggest further study are: Pneumonia, diseases of the circulatory system, influenza, other diseases of the respiratory system, Bright's disease and nephritis, violence other than suicide. In some cases it is necessary to study the figures for the entire decade to appreciate the significance of those for 1907.

The increase of deaths from diseases of the circulatory system and its connection with the decline in deaths from ill-defined causes have been discussed. The increase in the former in 1907 is slight in comparison with that for many of the other years of the decade, not at all accounting for the increase in the general death rate. The mortality from diseases of the nervous system other than meningitis, from Bright's disease and nephritis, from diarrhea under 2 years and from accidents reached its maximum in 1907. On investigation, the increase in accidents is found to be connected not at all with mortality from heat and sunstroke as was the decrease in 1902, but rather with increases in several sorts of casualties. A study of the deaths from influenza during the decade indicates that the great increase in 1907 over 1906 is due to an exceedingly favorable condition in the earlier year, although the fact that the deaths from this cause in 1907 were considerably

more than in any other year with one exception (1901) partially explains the increase in the general death rate. The mortality from pneumonia and other diseases of the respiratory system, while not at its maximum in 1907, was nevertheless heavy. Deaths from causes more or less influenced by climatic conditions (influenza, diseases of the respiratory system, diarrhea and enteritis under two years) account for about four-sevenths of the difference between the deaths in 1907 and the average for 1906 and 1908. The rest of the heavy mortality in 1907 was due in varying degrees to diseases of the circulatory system, nervous diseases other than meningitis, accidents, Bright's disease and nephritis.

A study of the rates in the various *sanitary districts* reveals in the Adirondack and Northern, Lake Ontario and Western, Mohawk Valley, West Central and East Central districts an increase from the minima in 1902 to or past the high rates in 1907, a tendency not uninterrupted in some districts. Doubtless much of this increase is due to improvement in the completeness of registration. This hypothesis is strengthened by the fact that in the Maritime district where the influence of New York City's more perfect registration is predominant, a decrease throughout the decade is obvious. While the organized public health movement of the metropolis is to be credited with this decrease, it is not to be supposed that similar work in other portions of the State has been without results. In my report for 1907 this point was discussed in the light of figures then at hand.[1]

Improvement in registration may also account for the fact that, while no general tendency of any sort may be traced in the Southern Tier, yet the last three years of the decade had the highest rates with the exception of 1904.

The Maritime district shows the greatest decrease of any district from 1900 to 1909 (20.2 to 15.9) and also the greatest by individual years. In the Hudson Valley a decrease is apparent but it has not been at all steady.

[1] State Department of Health, 28th Annual Report, Vol. I, pp. 215–216.

Table 15 shows the *urban mortality* for the State and the sanitary districts.

TABLE 15.— URBAN DEATH RATES OF NEW YORK STATE AND OF THE SANITARY DISTRICTS, 1900–1909, INCLUSIVE.

YEAR	State	Adirondack & Northern	Lake Ontario & Western	Mohawk Valley	West Central	East Central	Southern Tier	Hudson Valley	Maritime
1900.....	19.5	18.2	14.6	17.4	17.0	15.0	16.2	21.2	20.5
1901.....	18.8	19.3	15.2	16.5	13.9	14.1	14.8	19.9	19.8
1902.....	17.6	16.4	14.3	16.2	14.7	12.9	14.1	18.1	18.4
1903.....	17.4	17.0	15.6	17.0	17.0	14.3	14.3	18.8	17.8
1904.....	19.1	18.8	15.7	17.0	15.6	15.0	16.3	19.9	19.9
1905.....	17.7	18.0	15.5	16.0	15.3	15.0	15.6	19.5	18.2
1906.....	17.8	21.4	15.9	17.3	16.3	15.1	14.6	18.9	18.2
1907.....	17.9	20.8	16.4	17.9	15.9	15.1	15.5	19.7	18.1
1908.....	16.2	18.2	14.8	16.8	14.7	15.7	15.2	18.6	16.2
1909.....	15.9	18.4	15.0	15.2	14.7	14.5	15.0	18.5	15.9

The urban death rate of the State as a whole has fallen from 19.5 to 15.9, a decrease interrupted materially only in 1904. The higher rate in that instance is seen to coincide with a higher rate for that year in every district except the West Central, but most clearly marked in the Southern Tier, Hudson Valley and Maritime.

Downward trends are noticeable in the Hudson Valley and the West Central urban rates and a less marked one in those of the Southern Tier. At no time during the decade has the urban rate in the Hudson Valley been as high as in 1900, but its decline has not been without interruptions. At all times its rate has considerably exceeded the urban rate of the whole State, ranging in most instances between 1.1 and 2.6 per thousand higher. It has exceeded the rate in the Maritime district in every year except 1902 and the difference between the two has been rapidly widening.

The Mohawk Valley has a comparatively high urban rate and it is difficult to see any decided trend in it. The rates of the East Central and Lake Ontario and Western districts have been increasing, due partly no doubt to improved registration.

Perhaps to the same cause in part is due the increase in the urban rate of the Adirondack and Northern district. Its rate, however, deserves special attention, as it is high in comparison

with the urban rate of other districts. In six of the ten years its urban death rate was higher than the corresponding rate for the entire State, in four of the years being between 2.0 and 3.6 per thousand higher. This is the more striking because the district contains no large cities. A study of the rates of its three cities having over 10,000 population in 1910 (Watertown, Glens Falls and Ogdensburg) shows that its high urban rate is due to that of Ogdensburg. Since 1901 the rate for that place has not been below 24.4 and has risen as high as 30.1 and 31.1 (1907 and 1906). This excessive mortality is due in part to the fact that the St. Lawrence Hospital for the insane is situated there. The figures for deaths in that institution, available in the State Department of Health Reports since 1905, show that it has furnished from 24 to 30 per cent of the city's total mortality. If these deaths be substracted, however, the city rate is still high; in fact, for every year, higher than the urban rates of any other district except the Hudson Valley.

The most significant feature of the decrease in the urban mortality of the State appears in the noteworthy decline in the Maritime district, from 20.5 in 1900 to 15.9 in 1909, a downward trend broken only by the year 1904. The excess of its rate over the urban rate of the entire State has only twice been as much as 1 per thousand.

Table 16 gives the *rural death rates* for the State and the sanitary districts.

TABLE 16.—RURAL DEATH RATES OF NEW YORK STATE AND OF THE SANITARY DISTRICTS 1900–1909, INCLUSIVE

YEAR	State	Adirondack & Northern	Lake Ontario & Western	Mohawk Valley	West Central	East Central	Southern Tier	Hudson Valley	Maritime
1900	15.5	15.3	15.4	15.2	15.0	15.8	14.5	16.7	15.6
1901	15.3	14.4	14.5	15.5	15.6	15.8	14.1	16.2	16.3
1902	13.9	12.6	13.1	13.3	14.4	14.1	13.6	14.6	15.5
1903	14.4	13.0	14.1	14.3	15.2	14.2	13.8	15.3	15.5
1904	15.3	13.7	14.3	14.5	15.8	16.0	15.2	16.1	17.0
1905	15.2	14.4	14.7	14.4	16.1	16.1	14.2	16.1	16.2
1906	14.9	13.9	14.2	14.4	15.3	15.2	14.4	15.3	16.5
1907	15.7	14.1	15.0	15.1	16.2	16.1	15.3	16.5	17.4
1908	15.3	14.3	14.1	15.1	15.3	16.3	15.6	15.8	16.1
1909	15.1	14.6	14.2	14.3	15.2	15.7	15.4	15.7	15.7

In comparing the rates of the various districts it should be borne in mind that differences in accuracy of registration may account somewhat for differences in rates. The Adirondack and Northern has had, on the whole, the lowest rural rates. Those in the West Central, East Central, Hudson Valley and Maritime districts have in almost every year exceeded that of the State, the last district showing the highest rate for nearly every year.

No decrease in rates can be traced in the rural portion of the State as a whole. This is probably to be accounted for by improvement in the registration masking a real decrease. In my last report[1] the difference between the urban and rural rates was discussed. As the revised estimates of population give rates differing a little from those there presented, the urban and rural mortality with excess in the former is given below. The urban rates here are for cities of 10,000 and over; those given last year were for cities of 8,000 and over.

DEATH RATES IN URBAN AND RURAL NEW YORK

YEAR	In urban districts	In rural districts	Excess in urban districts
1900	19.5	15.5	4.0
1901	18.8	15.3	3.5
1902	17.6	13.9	3.7
1903	17.4	14.4	3.0
1904	19.1	15.3	3.8
1905	17.7	15.2	2.5
1906	17.8	14.9	2.9
1907	17.9	15.7	2.2
1908	16.2	15.3	.9
1909	15.9	15.1	.8
Decrease 1900–09	3.6	.4	....

These figures emphasize the statement made last year that the difference between urban and rural rates has been rapidly growing less. As there suggested, this is probably due to two causes, greater advances in sanitation in the cities and improved registration in the rural districts so great as to hide a probable decrease in mortality.

Respectfully submitted,

WALTER F. WILLCOX,

Consulting Statistician

[1] State Department of Health, 30th Annual Report, p. 243.

DIVISION OF COMMUNICABLE DISEASES

DIVISION OF COMMUNICABLE DISEASES

HON. EUGENE H. PORTER, A. M., M. D., *Commissioner of Health, Albany, N. Y.:*

SIR:—I have the honor to submit the following report of the work of the Division of Communicable Diseases for the year 1910.

This division of the State Health Department has developed greatly since 1907, at which time it was placed under the direction of Dr. John T. Wheeler, whose efforts in the preservation of the public health were beginning to bear fruit when the grim reaper saw fit to call him to his long home. Through his untiring efforts and those of his successors in the division, a friendly feeling has been created between the health officers of the various municipalities throughout the State and this portion of the machinery of the State Health Department, and it is a pleasure to be able to report that there are but few of the health officers delinquent with their monthly reports. Some, however, are rather dilatory, especially in making reports of the first cases of infectious diseases which appear in their districts, and I would remind the health officers that it is only by the cordial support of those interested in the conservation of the health of the State that this division is enabled to keep in touch with the morbidity of the different localities and render such aid as may be required either by advice or assistance through the medical officers of the State Health Department, whenever needed either to control or when possible to prevent an epidemic.

The State institutions and State hospitals are now reporting all cases of communicable diseases occurring among their inmates to the State Department of Health, either directly or through the health officer of the municipality in which they are located. This, with the increase of the number of reportable diseases, has somewhat increased the clerical work of this division. The following table will show the distribution of the morbidity of the State by counties:

	Tuberculosis	Diphtheria	Scarlet fever	Measles	Typhoid fever	Cerebrospinal meningitis	Smallpox	Ophthalmia neonatorum	Poliomyelitis
Albany	518	263	411	1,161	259	2	......	......	5
Allegany	23	32	149	281	50	8	3	......	4
Broome	208	54	101	385	77	......	1	1	2
Cattaraugus	66	48	226	851	46	3	1	2	3
Cayuga	88	38	184	181	111	1	......	3	......
Chautauqua	60	113	341	1,121	188	3	1	......	1
Chemung	190	111	152	60	74	......	......	2	6
Chenango	16	33	72	47	26	3	2	1	......
Clinton	39	48	51	364	96	......	......	......	......
Columbia	61	28	64	191	56	1	1	......	......
Cortland	12	8	21	286	68	1	1	3	......
Delaware	11	25	78	341	72	2	......	......	2
Dutchess	223	91	203	456	80	......	......	1	......
Erie	1,238	1,437	2,549	7,042	483	31	54	5	6
Essex	438	74	34	240	38	......	......	......	......
Franklin	652	53	29	158	40	2	......	......	3
Fulton	14	41	32	425	10	1	......	......	......
Genesee	14	26	119	603	18	......	......	1	1
Greene	14	13	19	265	67	......	......	......	......
Hamilton	4	......	......	6	10	......	......	1	......
Herkimer	33	44	31	302	20	1	21	1	2
Jefferson	55	51	81	2,708	216	4	30	1	8
Lewis	10	6	5	338	18	......	22	......	1
Livingston	13	5	161	290	9	......	......	1	1
Madison	27	20	125	226	11	2	......	......	......
Monroe	263	245	1,818	678	258	3	......	3	3
Montgomery	92	103	228	235	45	1	......	......	1
Nassau	47	101	189	378	46	......	1	2	......
Niagara	94	152	298	1,092	321	3	72	1	......
Oneida	145	215	128	707	90	6	1	4	......
Onondaga	248	477	1,103	2,311	312	2	......	1	1
Ontario	29	40	78	47	64	......	......	......	3
Orange	121	182	353	1,259	152	......	5	1	......
Orleans	15	17	63	34	20	......	1	......	......
Oswego	30	46	75	189	106	1	1	......	......
Otsego	33	22	97	461	66	......	1	1	3
Putnam	2	6	11	62	12	......	......	......	......
Rensselaer	222	168	212	877	130	2	......	......	4
Rockland	30	95	121	167	18	......	1	2	1
St. Lawrence	30	83	57	1,318	98	2	95	......	1
Saratoga	58	54	64	1;044	74	1	......	......	1
Schenectady	218	131	142	1,437	140	1	3	......	14
Schoharie	17	8	19	407	17	1	......		......
Schuyler	13	......	17	22	7	......	......	......	......
Seneca	22	9	123	128	51	......	......	......	3
Steuben	41	15	53	386	147	3	......	2	10
Suffolk	114	66	162	855	56	......	5	......	......
Sullivan	631	12	71	74	28	......	......	1	2
Tioga	8	7	16	13	14	1	1	......	......
Tompkins	19	9	71	144	52	1	1	......	4
Ulster	22	121	140	502	64	2	4	2	......
Warren	30	24	24	72	23	1	......	......	4
Washington	16	22	68	59	25	......	......	......	......
Wayne	17	25	51	254	63	2	......	......	3
Westchester	394	472	1,282	1,369	278	4	1	......	3
Wyoming	11	13	32	406	45	......	2	1	......
Yates	4	8	8	194	19	2	......	......	......
Greater New York	32,006	17,226	19,284	35,816	3,735	230	16	......	......

Two counties were not visited by the diphtheria germ and only one escaped scarlet fever.

A mortality table of the different infectious and contagious diseases has not been prepared, as this is dealt with by the Division of Vital Statistics in an able and exhaustive manner.

The medical officers have frequently been called upon to render valuable assistance to the health officers throughout the State, not

only in cases of doubtful diagnosis but in establishing and maintaining an efficient isolation and quarantine of infectious and contagious diseases. Their counsel is often of great benefit both to the health officer and the community in the prevention and control of epidemics.

There have been reported to the Department during 1910, as shown by the following table, which likewise shows the distribution of them through the year, 171,345 cases of those communicable diseases, of which a report is required and which are here designated:

Cases of communicable diseases reported during 1910

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Tuberculosis	2,416	3,203	4,497	3,969	3,418	2,692	2,621	3,375	2,856	2,684	3,240	2,996	37,963
Diphtheria	2,018	2,025	2,489	2,447	2,654	1,835	1,468	1,363	1,010	1,509	2,144	1,668	22,630
Scarlet fever	3,635	4,565	5,346	4,412	4,061	2,486	987	688	579	924	1,673	2,128	31,504
Measles	9,726	10,047	13,770	9,931	10,490	6,837	2,474	883	452	722	1,593	2,953	69,878
Typhoid fever	456	566	457	322	374	356	486	1,203	1,457	1,293	989	577	8,536
Cerebrospinal meningitis	27	32	34	32	36	20	21	36	28	22	17	26	331
Smallpox	51	50	69	61	55	41	10	10	1	1	2	2	353
Ophthalmia neonatorum	.....	.....	2	2	4	4	6	1	7	5	5	2	38
Poliomyelitis	.....	.....	.....	.....	.....	.....	.....	.....	57	35	18	2	112

Diphtheria

There were 22,630 cases of diphtheria reported. This is 2,000 more than in either of the two years preceding. The number of deaths is 2,431, an increase of 125 from last year. The average number of deaths yearly for the past ten years has been 2,675; of the five years preceding this year, 2,470. There have been only two years in which the number was less than in 1910.

New York city reports more than half the increase in reported cases, but the number of deaths is identical with last year. The rural mortality is likewise identical. The increase in cases and deaths is in Buffalo, where the disease became more prevalent during the last quarter; in Rochester, Utica, Troy and some of the cities of the third class.

The urban mortality from diphtheria was 2.0 per cent. of the total mortality; the rural 0.6 per cent. These were the propor-

tions of last year; in 1909, of 2,300 deaths from diphtheria 2,100 were urban; this year, of 2,431 deaths, 2,100 were urban, this population being two-thirds of the State. In 100,000 urban population there were 33 deaths during the year; in 100,000 rural population there were 11 deaths.

In the State 1.6 per cent. of the mortality was from diphtheria and there were 27 deaths per 100,000 population. For the ten years prior to 1895, 5.3 per cent. of the deaths were from diphtheria, the average yearly mortality being 5,734, and there were nearly 100 deaths a year per 100,000 population. Since 1895 there have been about 3,000 deaths yearly from diphtheria, the population having increased from six to nine million.

There have been no noteworthy epidemics from diphtheria during the year; the State institutions have been mostly free from it. The experience of the year has given further evidence of the value of the prophylactic use of antitoxin. The early use of antitoxin has been urged for clinical cases, and when question has arisen as to the ability of subjects to pay for it, it has been urged on health officers that the first thought should be the safety of the people and the conservation of their lives.

Of questions asked, one has been as to quarantining subjects who have been exposed during the period of incubation, and it has been found safe to release such under observation with immunizing doses of antitoxin. Emphasis has been laid on the laboratory test for diagnosis and as a guide for release from quarantine. The question of management of cases of persisting germs long after clinical symptoms have disappeared, in one case as long as six months, has come up. The infectivity of such subjects is recognized and the virility of the bacilli is established, but it has been advised to modify the strict quarantine, excluding the child from school and from contact with other children. Indefinite isolation is hard to enforce and no harm is known to have come in this instance. In one locality not a few of the school children, not ill, had persistent positive cultures, and the school was closed for a length of time.

The relation of bad sanitation to diphtheria has been asked about. Emphasis should be laid on the fact that the disease can only arise from specific infection. Insanitary surroundings can

have only a general bearing on its virulence and dissemination; doubtless it may influence the septic nature of the disease.

The relation of the dairy to diphtheria has been the subject of inquiry. Milking or washing of milk pails by members of a family in which diphtheria exists, where the dairy product is to be sold, has been interdicted.

Mild cases have frequently been the source of spread, the nature of the disease having been overlooked. If there is reasonable doubt the public should have the benefit of it, pending a laboratory test. The experience of the year has emphasized the value of isolation and of antitoxin used early in a clinical case and for immunizing those, especially children, exposed to diphtheria. There has been no recognized case reported of spread of the disease by a germ case, though this has been discovered heretofore. The disease has not been as virulent as formerly and few septic cases have been reported. In this diphtheria has been in common with the other infectious diseases and it is possibly due to the better sanitary surroundings which are being made more and more general. In New York city there was one death to ten reported cases, which is a considerably lower lethality than last year; in the rest of the State 1 death to 7.7 reported cases. In the city it chiefly prevailed in the spring months; outside the city it increased abruptly in October and chief prevalence was from then till December. The most deaths were from January to April.

Scarlet Fever

From 1895 to 1900, a period of six years, there were less than 800 deaths a year from scarlet fever; then for four years the number was 1,200; two years followed of 700 deaths; and now for four years there have been 1,600 deaths yearly. Periods of prevalence, four to six years in duration, follow period of abatement. The disease is of milder type and virulent cases are infrequent. From 1888 to 1892 there were, with the break midway of one year of abatement, from 2,000 to 2,500 deaths a year from it, a mortality never since reached. This year there were 1,600 deaths, a larger number than has occurred, save one year, since 1892.

There were 31,000 cases reported, a number exceeded only by measles and tuberculosis, and exceeding by 8,000 the number in

1909. In 1908 the number both of cases and deaths was somewhat greater. Greater New York reported nearly 20,000 cases, against 13,000 last year; with one death to 20 cases. The rest of the State had a rate of 1 death to 18 cases, which, however, probably shows that 1,000 cases failed of report. And many cases must have failed of detection, for our investigations have disclosed the overlooking of the disease repeatedly by physicians, and the existence of cases which never came under the care of a physician.

One of the embarrassments of the year has been the difficulty of diagnosis in the case of mild forms of scarlet fever. Some outbreaks have been overlooked by the medical men. In some the sore throat has been the conspicuous symptom and erythema if present has been regarded as secondary; "epidemic tonsilitis" has been entertained as the diagnosis of a number of outbreaks until not a few cases have developed and the fact of scarlet fever was established. The eruption has often been evanescent or irregular in its appearance. Physicians err often in attaching weight to the absence of certain symptoms, unmindful that in scarlet fever no symptom is pathognomonic and no one symptom necessarily present. It has been found that emphasis can be laid on the abrupt onset, early sore throat and the orderly occurrence of a rash after twelve hours and usually first on the upper chest, though it may occur elsewhere, and in rare cases has not been detected even evanescently; the red tongue with enlarged papillae has been very commonly present; streptococci in the throat have been regarded as of positive value; glandular tumefaction has much of the time been lacking. Desquamation is often so slight or to be detected only by such careful scrutiny as to be overlooked or declared absent.

As an instance of the tracing of an outbreak: A young man came home from abroad ill with fever and a sore throat, for which he received office treatment once by a physician; nine days later his sister has a similar illness, which after two weeks abates and she returns to school; the teacher is taken ill nine days after her return and is variously diagnosed as having tonsilitis and scarlet fever; pupils follow with illness and eruptions called "teething rash" and "humor of the blood," but in some instances recognized

as scarlet fever; the disease even appears, though without further result, in the family of a man employed in a milk depot; scarlet fever becomes widespread in the community before its nature is recognized.

Frequent inquiry is made for a rule as to duration of quarantine. This has been left indeterminate, as no certain period can be given to cover every case. Mild cases may recover fully in a shorter period than severe cases; in any case discharge from the ear set up in the course of scarlet fever may prolong infectivity indefinitely. All clinical symptoms may abate in three weeks, and in others may continue for twice that length of time. It has been advised during the year to keep children from school for not less than five weeks and to release from quarantine after six weeks provided the mucous surfaces are clear.

Closing schools and churches and other congregations has been regarded an extreme measure and not to be resorted to without good cause. Personal inspection by teachers under instructions from the health officer has been an effective means for detection of mild cases, for which the maintenance of schools has had compensatory advantage. Clandestine cases, and mild ones recognized by no one, restiveness under their efficient quarantine, the quarantine of apartments, the possibility of isolation that shall allow liberty to the male adult breadwinner, the use of placards, are questions and difficulties that have called for investigation by the Department and have swollen the correspondence of the year. There has been no well established instance coming to attention of a milk-borne epidemic.

Scarlet fever was most prevalent during the first half of the year; it has become again prevalent in December, with a probability of being somewhat less so during the coming year.

Measles

There were 70,000 cases of measles reported in 1910 and no doubt a great many more not reported. In New York city there were 34,000 cases, not far from half the total for the State, while 60 per cent. of the deaths occurred there. There was one death to 44 cases in the city and one to 70 in the rest of the State. The

reported cases in the city were not much in excess of last year; of the rest of the State the number is very much larger.

The urban mortality which was 18.2 per 100,000 population in 1909 is 16.2 in 1910. The rural is 8.5 against 4.7 in 1909. The total State mortality is the same as that of last year.

For the first decade of the records of mortality of this Department, beginning with 1885, there were 10,500 deaths from measles and 16,300 from scarlet fever; during this decade occurred almost as many deaths from scarlet fever as in the sixteen subsequent years. In these sixteen subsequent years there have been 17,300 deaths from measles and 16,500 from scarlet fever. In nine of these years the measles mortality has been greater than the scarlatinal. Taken by five year periods the deaths from measles have been, 5,113; 5,400; 5,228; 5,012; 5,800. For the same five year periods the deaths from scarlet fever have been, 8,119; 8,195; 4,017; 5,585; 5,340. This shows that while scarlet fever is decreasing, measles shows no change in actual mortality. Scarlet fever has become mostly a mild disease, while measles continues pretty much the same as formerly.

The number of reported cases of measles for the year far exceeds any other reported communicable disease and is more than double the number for scarlet fever. It is, to be sure, much less fatal, 1 death in 50 cases against 1 in 20. Probably if the remote effects of measles were ascertainable by records it would be found that its credited fatality would be increased. As it is much more contagious, few escape it when it gets a good start in a community; moreover, the people do not shun it as they do other diseases.

The largest number of cases were reported in March and the most deaths of any month occurred then and in April; the case-fatality was also greater then. In the last half of the year there have been few deaths.

Typhoid Fever

There were 8,536 cases in the State, against 7,894 in 1909; of these 3,735 came from New York city, 100 more than last year. The deaths were 1,374, of which 558 were in the city. This is rate of deaths to cases of 1 to 6 outside the city and 1 to 6.7 in the city.

For the last three years there have been 1,350 deaths a year; for the five years preceding, 1,600; and during twenty-five years the mortality has been between 1,300 and 1,600, in only a few exceptional years exceeding that number because of some unusual epidemics. The rate per 100,000 population has decreased from about 25.0 for five year period averages to 15.0 in the recent years.

There were no large epidemics during the year. Attention was attracted to unusual prevalence at Syracuse, Union Springs, Moravia, Ithaca, where there were 35 cases traced to a milk source; Clayton, where it became prevalent the year before; Lyons, Palmyra, Pine Plains, Jamestown. Besides these, investigations of some smaller communities were instituted because of an increase in reported cases. At Willard State Hospital and the Syracuse Institution for Feeble-Minded Children there was an excessive number of cases of typhoid fever.

With a death rate of 15.0 per 100,000 population for the State, New York city rate was 11.7; Buffalo, 18.4; Rochester, 13.7; the cities of the second class as a group, 17.3; the larger cities of the third class, 32.3; of twenty-three cities having from 10,000 to 20,000 population, 28.0; and of four cities under 10,000 population, 42.0. The rural rate was 15.5. The excess of prevalence is in the smaller cities, which are generally above the State average. The cities which have had less than a 15 death rate are, New York, Rochester, Albany, Utica, Schenectady, Binghamton, Auburn, Mt. Vernon, New Rochelle, Gloversville, Lockport, Glens Falls, Olean, Lackawanna, Little Falls, Fulton and Johnstown. Their combined mortality is 11.5. That of the rest of the incorporated cities is 30.0, double the entire State rate. Those which have had this year conspicuously high prevalence have been Niagara Falls, Watertown, Cohoes, Port Jervis, Cortland, Corning, Oswego, Hudson, all having a rate of more than 50, while Newburgh, Ogdensburg, Watervliet, Ithaca, North Tonawanda, Hornell, Batavia and Oneida have had a rate above 30 deaths per 100,000 population, and Syracuse, Elmira, Jamestown, Dunkirk, Middletown, Peekskill, Geneva, Plattsburgh, Rensselaer and Tonawanda have been but little below this average.

In some of these cities typhoid fever has been long prevalent from infected water supply. In Niagara Falls, the most note-

worthy instance, measures to rectify this are under way. In some the increase has been recent and not due to long prevalent conditions. Syracuse has had a very complete investigation by the Sanitary Engineering Division for a prevalence perhaps due to a not permanent disturbance of the water supply system. A detailed report of the investigation of the Syracuse situation will be found under the Division of the Sanitary Engineers. Ithaca had a considerable milk-borne outbreak. Numerous smaller places have been under investigation for excess of the disease.

Water has been the chief carrier of infection; 136 cases were traced to direct infection. The ease with which typhoid fever may be so taken is overlooked, that is, by so-called contact infection, in which may be included fly-infection, which likewise is the result of imperfect care of the sick. Several milk epidemics have been verified during the year, and of other food infections there are few established instances; in one instance 10 cases were attributed to ice cream cones as a possible source of infection.

There is a shifting of the seasonal prevalence of typhoid, taking the safe guide of its mortality as a basis; it is less a winter disease than formerly. The average yearly mortality for the decade 1891–1900 was:

For the winter months	406
For the spring months	276
For the summer months	331
For the fall months	666

For the corresponding seasons of 1910 the number of deaths was, respectively, 305; 223; 298; 518.

This gives a seasonal distribution of the deaths of the year as follows:

	For the decade 1891–1910 Per cent.	For 1910 Per cent.
In the winter months	24.20	22.69
In the spring months	16.45	16.60
In the summer months	19.70	22.17
In the fall months	39.65	38.54

A smaller proportion of the deaths occur now in the winter, and a larger proportion in the summer. It has been found heretofore that the winter mortality is high in cities supplied with water from large sewage-bearing streams and low in rural communities. This is illustrated in Niagara Falls, where in the last two years there have been 54 deaths from typhoid fever, of which 19 were in the winter, 10 in the spring, 15 in the summer and 10 in the autumn months.

Unscreened vaults and the convalescent typhoid germ carrier have been the medium of spreading this disease through the agency of flies and by other means. This has been found on our investigations. Every case of this disease calls for investigation, and the local health officer has been urged to personally inquire into the source. A large part of the work of investigating outbreaks or of localities where typhoid fever has become established for a long time has very properly fallen on the Engineering Division of the Department, as most causes are of secondary importance to the chief one of an infected water supply.

Cerebrospinal Meningitis

The number of reported cases of this disease, 353, is less than the number of last year. But the reports are incomplete, since the reported deaths are 453. New York city reported 230 cases and 294 deaths. The rest of the State had 160 deaths, equally divided between the other cities and the rural population. The disease is of the cities and the mortality to population is double that of the country under the conditions of mild prevalence of recent time.

Smallpox

This disease has much decreased in prevalence; 355 cases occurred and there were 7 deaths. There has been much vaccinating during recent years and the result has been felt. Thirty-seven counties had cases, but in twenty-seven there were only the one imported case or the spread was limited to two or three secondary cases. Most of the cases of the year came into two areas of prevalence. In the fall of 1909 a case came from Canada to North Tonawanda, Niagara county, and the outbreak that followed not

only lasted there until July but spread to Niagara Falls and Lockport; to Buffalo, Tonawanda and Wheatfield, Erie county, and probably to other towns. About one-third of the cases of the State and one death came here. Another third or more occurred in another outbreak which started in a lumber camp in the northern part of Herkimer county and was carried by indifferent and irresponsible people in the country about in Jefferson, Lewis and St. Lawrence counties. In one of these areas the outbreak was prolonged by opposition to vaccination and in the other by ignorant indifference to it. In Steuben county there were 10 cases in five towns; in Walden 5 with 1 death; in New York city 16 with 5 deaths. In no other municipality except those noted were there as many as five cases during the year. In every instance, where needed, an expert of the Department has visited the location of smallpox cases and rendered material assistance to the health officer.

Epidemic Poliomyelitis

This made its appearance in September. An epidemic occurred in 1909 about Gouverneur, in St. Lawrence county; there had been a large epidemic in 1908 in New York and Westchester county. It had been prevalent in Massachusetts in 1909 and became more so in 1910, as likewise in numerous other States specially in the middle West. In this State it became extensively prevalent in August and continued until December. In forty-seven of the sixty-one counties there were cases reported to the total number of 327. The number of deaths reported was fifty-six. There were no special centers from which cases spread from one community to another; a few cases, often but one or two, occurred in most of the localities. In the cities of Buffalo, Rochester, Syracuse, Schenectady, Elmira there were cases, the greatest number, twenty-five, occurring in Buffalo. There were at the same time cases in larger villages and in the rural towns remote from railroads. Affected localities were along the Mohawk Valley rather numerously, in the Southern Tier counties along the Erie railroad, but also in the sparsely settled communities between, in the northern part of the State, and all the way between Long Island and Niagara Falls. There was a recurrence in the towns of St. Lawrence county in which the epidemic of 1909 appeared.

Early in January, 1911, Dr. W. H. Frost, Passed Assistant Surgeon, U. S. Public Health and Marine Hospital Service, made a detailed study of the 227 cases of epidemic poliomyelitis which were reported to the State Department of Health during the year 1910. Dr. Frost has submitted a detailed report of his investigation which will subsequently be published and circulated by the State Department of Health.

Whooping Cough

Considerable attention has been drawn to this disease owing to the fact that the average yearly mortality has been almost 1,000. A measure of control has been advocated which it is believed will in some degree lessen the spread of this very annoying and distressing malady. A leaflet of instruction has been printed for distribution by the health officers, wherever this disease is prevalent.

No reports of the number of cases have been received, but hereafter they are to be called for from health officers. The average mortality from it in this State has been 900, that of measles having been 1,100 and of scarlet fever 1,300 for the last twenty-five years. This year there were 726 deaths and that has been its average for the last ten years. Not infrequently it has caused more deaths in the year than has measles or even scarlet fever. Its midsummer mortality is highest; this year there were double the number of deaths both in July and August of any other month, which is not unusual.

Ophthalmia Neonatorum

The campaign which was begun in 1909 for the suppression of ophthalmia neonatorum has been successfully carried on during the year 1910. With this disease, as with some others, much difficulty has been experienced by this Department in getting the physicians to report its prevalence. For instance, only forty-two cases of ophthalmia neonatorum were reported to this Department from January 1 to December 31, 1910. Knowing that this small number by no means represented the actual prevalence of the disease throughout the State, a circular letter was addressed to about 6,000 physicians outside of Greater New York asking them to report at once such cases as had occurred in their practice during the past year. This request was responded to by over 2,000 phy-

sicians, from whom reports were received of 277 cases of ophthalmia neonatorum.

Cases were reported from 52 counties, while 7 counties failed to report a single case. Onondaga county reported the greatest number of cases, 35; Erie, 29; Monroe, 19; Nassau, 16; Oneida, 11; Westchester, 10; Chemung and Schenectady, each 9; Steuben and Wyoming, each 8; Broome, 7; Franklin, Rensselaer and St. Lawrence, each 6, and many others from 5 to 1 case. The numerous replies received from the physicians throughout the State clearly indicate the educational influence which this campaign has exerted, in that practically all physicians are to-day employing either the silver solution supplied by the State or some other prophylactic measure in every case of confinement. It is also very gratifying to find in analyzing these 277 cases that only one child was blind in both eyes, 6 blind in one eye, while 270 cases had a favorable outcome.

Influenza

The annual epidemic of influenza reached its height in March. It began in December preceding, and lasted into May. The number of deaths directly credited to it is 1,439; in 1909, 1,117. How many cases of it occurred and how many deaths it was the dominant contributing cause of is a matter only of conjecture. Since during the epidemic there is increase in the number of deaths from pneumonia and other acute diseases of the respiratory system, from consumption, from diseases of the circulatory, nervous and digestive systems to some degree; and since this increase as a matter of record set in abruptly with the first outbreak in 1889 and has continued from that time, it is safe to attribute a certain proportion of this increase to influenza. This has been estimated year by year heretofore and the table of estimates is carried down here. In the twenty years past there has been an average yearly estimate of 7,000 deaths from influenza, which is no doubt conservative; varying with the severity of the epidemic from 2,500 to 11,500 and in duration three to six months. The intensity of the epidemic increases to its acme, which may take two or three months even in mild epidemics, and hence it diminishes, generally covering a period of five or six months. March is more often, as this year, the high point of the epidemic, but not

infrequently it has been January. In March there were 14,134 deaths from all causes, the largest number in the year; 400 were ascribed directly to influenza. One-third of the deaths occurred past the age of 60 years; deaths from consumption, acute respiratory, circulatory and nervous diseases were all excessive.

Grippe pneumonia is a recognized form of pneumonia by the medical profession. The United States census report shows the urban mortality as very much lower than the rural. In this State the actual reported rural mortality this year was 798, while the urban mortality in nearly three times the population was 641, or a death rate of 10 in the latter to 33 in the former.

Estimated Mortality from Epidemic Influenza

EPIDEMIC YEAR	Height of epidemic	Duration	Estimated mortality	Acute respiratory mortality
1890	January	3 months	5,000	18,053
1891	April	6 months	8,000	20,697
1892	January	5 months	8,000	20,432
1893	April	6 months	6,000	19,807
1894	January	4 months	3,000	15,885
1895	February	4 months	5,000	17,725
1896	March	5 months	2,750	16,820
1897	March	4 months	3,000	16,277
1898	March	6 months	2,500	16,350
1899	January	5 months	7,000	17,938
1900	March	6 months	11,500	19,232
1901	January	5 months	7,000	17 589
1902	February	6 months	5,000	16,986
1903	March	6 months	8,000	17,339
1904	March	6 months	10,000	21,132
1905	February	5 months	9,000	17,832
1906	March	6 months	9,000	20,178
1907	January	6 months	10,000	22,663
1908	January	5 months	9,500	18,477
1909	March	5 months	9,000	20,781
1910	March	5 months	10,000	21,487

Pneumonia

It has been decided to place pneumonia on the list of reportable diseases, a special card for which has been prepared and distributed to the physicians of the State through the health officers. The infectiousness and contagiousness of pneumonia has become more and more apparent and its extensive mortality rightfully makes it one of the most important diseases with which the Department has to contend. During the year 1910, 9,843 people died of lobar pneumonia, while 7,240 succumbed to broncho-pneumonia.

The combined mortality of the pneumonias exceeds the total mortality throughout the State from tuberculosis, and as both of these diseases are in a measure preventable, many valuable lives should be saved by the systematic management as now planned by the Department.

Cancer

Cancer, like pneumonia, has been placed on the list of reportable diseases and a separate card likewise prepared on which to report the detailed history of each case occurring throughout the State. The deaths from cancer are increasing far more rapidly, in proportion, than other diseases throughout the State. During the year 1910, 7,505 people died in this State from cancer. This is an increase of 470 over 1909, while from tuberculosis there was an increase of 100. This Division is carefully studying the details of every case reported and proposes to prepare a map showing the geographical distribution of cancer throughout the State, for the purpose of locating, if possible, what appears to be certain localized infected regions, in which this disease is particularly prevalent. A more extensive report on the prevalence of cancer and the work which is being done in the investigation of the same will be found under the report of the Cancer Laboratory, in this same volume.

Infant Mortality

Infant mortality has engaged the attention of the Department and special efforts to lessen the death rate under one year have been made. The causes are many and do not all fall within the control of the health officer, but it is gratifying to note that the percentage of infant deaths is decreasing throughout the State. Improper feeding is the chief cause of infant mortality, and as milk is the most widely used article of food for babies it is necessary that the health officers not only of our cities but also of the rural districts should exercise care in the supervision of the milk supply. No milk should ever be shipped from a farm where a contagious disease exists, unless it is absolutely certain that every precaution has been taken to prevent a possible infection of the milk.

In the decade 1885 to 1895 the deaths under five years were 35.0 per cent. of the total mortality; in the last decade this early life mortality has been uniformly 27.0 per cent. of the total.

Tuberculosis

In 1910 there were reported 38,000 cases of pulmonary tuberculosis, of which 32,000 came from New York city. New York and Buffalo reported 20,000 cases in 1907; 24,000 in 1908; 27,000 in 1909; 33,150 in 1910. In the rest of the State 2,100 cases were reported in 1907; 2,635 in 1908; 5,820 in 1909; 4,800 in 1910. The increments are due to fuller reports, it having become only recently reportable.

The greatest number of new cases were reported in March, in April and in May; the smallest in June and July.

Tuberculosis — Registration of Living Cases

	1907		1908		1909		1910	
	Rest of State	Greater New York	Rest of State	Greater New York	Rest of State	Greater New York	Rest of State	Greater New York
January	262	1,446	256	1,609	1,469	2,270	167	2,249
Total	1,708		1,865		3,739		2,416	
February	222	1,244	284	1,518	587	1,765	458	2,745
Total	1,466		1,802		2,352		3,203	
March	267	2,133	330	2,445	592	2,505	523	3,974
Total	2,400		2,775		3,097		4,497	
April	193	2,105	279	1,937	563	2,452	451	3,518
Total	2,298		2,216		3,015		3,969	
May	136	1,728	309	1,673	374	2,297	452	2,966
Total	1,864		1,982		2,671		3,418	
June	125	1,408	347	1,674	457	2,298	514	2,178
Total	1,533		2,021		2,755		2,692	
July	242	1,733	137	2,160	725	1,913	490	2,131
Total	1,975		2,297		2,638		2,6 1	
August	204	1,497	207	1,755	510	2,019	485	2,890
Total	1,701		1,962		2,529		3,375	
September	190	1,739	226	2,431	312	2,35.	454	,402
Total	1,929		2,657		2,664		2,856	
October	229	1,338	305	2,023	437	1,839	710	1,974
Total	1,567		2,328		2,276		2,684	
November	229	1,363	271	1,826	460	2,483	511	2,729
Total	1,592		2,097		2,913		3,240	
December	277	1,788	359	1,869	422	1,786	742	2,250
Total	2,065		2,228		2,208		2,992	
Total	22,098		26,230		32,887		37,963	

The above table should not be accepted as proof that tuberculosis is increasing throughout the State, but rather that the State

law requiring the registration of all cases of tuberculosis is being more generally observed by the medical profession. This, together with better methods of diagnosis and a clearer understanding of the disease by the public, has led to fuller reports of the "White Plague" being received.

Doubtless many cases of tuberculosis are not reported, but the tuberculosis exhibit now on the road and the mass of literature distributed, not only by this Department but also by the various social organizations, is having a salutary effect.

A full account of the tuberculosis exhibit work will be found in another portion of the annual report, together with the report of the action taken by the different counties and cities in regard to the establishment and maintenance of hospitals for the care of tuberculosis.

The deaths from pulmonary tuberculosis for the year are 14,059. This is 100 more than in 1909, and 100 less than the average of the preceding years. The deaths were 9.5 per cent. of the deaths from all causes.

In the twenty-five years preceding 1910 there occurred 319,800 deaths from pulmonary tuberculosis, and 3,036,200 deaths from all causes. This makes 10.5 per cent. of the deaths from this cause.

Is tuberculosis decreasing? To determine this we have no statistics of existing cases to throw light, for even after a few years of reporting them the reports are incomplete and untrustworthy for statistical data, and we have no record of the number of existing cases in past years. Neither do we know the average duration of illness from tuberculosis. We have a certain guide to the mortality, the record of which is fairly trustworthy. This we have record of for this State since 1885. The yearly number of deaths has been pretty constant, with moderate yearly increase; beginning with 12,000 it has grown to 14,000. During this period the number of deaths from all causes has increased from 90,000 to 140,000. The population has grown from less than six million to more than nine million. While the population has increased fifty per cent and the total deaths in the same proportion, the tuberculosis mortality has increased less than one-fifth. This is shown by five-year periods, and for 1910:

5 YEAR PERIODS	Estimated population	Death rate (all causes)	Average yearly deaths from consumption	Per cent tuberculosis mortality	Tuberculosis deaths per 1,000 population
1885–1889	5,750,000	16.43	11,915	12.6	2.07
1890–1894	6,300,000	19.33	13,320	11.0	2.11
1895–1899	6,880,000	18.10	13,115	10.9	1.90
1900–1904	7,500,000	17.50	13,258	10.4	1.77
1905–1909	8,750,000	17.00	14,157	10.1	1.62
1910	9,158,328	16.10	14,059	9.5	1.

The second period, 1890–4, shows a larger mortality than the two following periods, and the largest per capita death rate of the series. The total mortality is high, with a death rate of 19.33, which is the highest on our records. This is explained by the pandemic of influenza which began in 1890. With this exception there has been a steady decrease in the death rate from tuberculosis. That of the year 1910 corresponds to a saving of 50 in 100,000 population over the rate of the decade 1885–95.

Compared with deaths from other causes the decrease is constant and unbroken. Twenty-five years age one-eighth of the deaths were from pulmonary tuberculosis, and now they are less than one-tenth. If the proportion of deaths from tuberculosis were the same this year as then, there would have been 18,000 instead of 14,000. If the same per capita mortality prevailed now as then, the number of deaths would be found to be even greater, almost 19,000. Indeed, the lowering of the general death rate corresponds pretty closely to the saving in deaths from tuberculosis. If the rate of mortality of to-day had prevailed twenty-five years ago there would have been 9,000 instead of 12,000 deaths annually from this cause.

In what populations of the State is saving in tuberculosis mortality being effected? The urban and rural rates of death from this, along with the rates in the sanitary districts, for the past five years, is as follows:

Deaths per 1,000 *population in the Sanitary Districts*

YEAR	Urban	Rural	Maritime District	Hudson Valley	Adirondack	Mohawk Valley	Southern Tier	East Central	West Central	Western
1906	1.95	1.30	2.10	1.61	1.35	1.17	0.90	1.20	1.00	1.15
1907	1.95	1.25	2.12	1.75	1.34	1.34	0.90	1.26	1.12	1.19
1908	1.85	1.23	2.05	1.72	1 38	1.33	0 96	1.25	1.13	1.16
1909	1.76	1.20	1.90	1.61	1.30	1.25	0.80	1.20	1.03	1.20
1910	1.65	1.21	1.78	1.65	1.28	1.10	0.74	1.18	0.80	1.16

This record shows that the chief decrease is in the city population. There is but little change in some of the districts, although most of them show some decrease, and especially in the last three years. The Southern Tier District has always been noted for its freedom from tuberculosis. That tuberculosis is a city disease is shown by its mortality in districts with large urban population.

In submitting the above report I desire to tender thanks to Dr. F. C. Curtis, consulting dermatologist, for his assistance in compiling the same.

Respectfully submitted,

WILLIAM B. MAY,

Director

REPORT

OF THE

TUBERCULOSIS CAMPAIGN

REPORT OF TUBERCULOSIS CAMPAIGN

ALBANY, N. Y., *May* 1, 1911.

Hon. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to herewith submit a report on the work in connection with the tuberculosis campaign for the year 1910.

The work of the year was in charge of Mr. C. W. Fetherolf until November 22, 1910, when Dr. E. G. Whipple was temporarily appointed to fill the vacancy caused by Mr. Fetherolf's resignation. In an examination on February 18th Dr. Whipple qualified under the civil service, and on March 15th received the appointment as director of the tuberculosis exhibit. The work since November 22d has been in his charge.

During this year the large exhibit of the State Department of Health has been shown in the following ten cities, in which a vigorous anti-tuberculosis campaign has been carried on conjointly with the State Charities Aid Association:

1. Niagara Falls.
2. Lockport.
3. Amsterdam.
4. Watervliet.
5. Glens Falls.
6. Saratoga.
7. Plattsburg.
8. Malone.
9. Ogdensburg.
10. Watertown.

A definite program was agreed upon before starting this series of campaigns, and wherever possible, it was closely followed.

This program included meetings for church organizations, which were usually held on the opening Sunday. Meetings for school children of the public and parochial schools were held during the school hours, both mornings and afternoons. One afternoon during the week was given over to the women of the city and the meeting conducted under their auspices. The evening meetings were held for fraternal, labor, military, business men's, religious and other prominent local organizations. Sometime

during the week a meeting was held under the auspices of the city or county medical society, at which some physician, expert on the subject of tuberculosis, was asked to be present and speak on this subject, giving special attention to the diagnosis of early cases. The series of meetings ended with the mass meeting usually held on Friday night, making a campaign of six days, during which time every group of citizens and all classes of people were reached to some extent.

It was at Niagara Falls that the first campaign of this year was inaugurated. Here the usual program was followed, the opening day including separate meetings for Polish and Italian residents.

On Tuesday evening a special meeting for physicians was held under the auspices of the Niagara Falls Academy of Medicine at the Hotel Imperial. A dinner preceded this session, attended by 41 physicians. The paper of the evening was presented by Dr. G. W. Beach of Binghamton, N. Y., on "Why Many Cases of Early Pulmonary Tuberculosis Are Not Found by Physicians."

On Friday night the campaign closed with the mass meeting, at which Dr. J. H. Pryor of Buffalo, Dr. Francis E. Fronczak of Buffalo, Rev. E. J. Walsh and Senator James P. Mackenzie were among the speakers.

Immediately following the campaign, provision was made by the city for examination of indigent cases, Drs. E. B. Horton and C. G. Leo-Wolf contributing their services. A total attendance of 5,076 was reached during this campaign.

On Sunday, January 30th, the second campaign of the series opened in Lockport at the Walton Rink. The opening day was made "Industrial Sunday," and the meeting held especially for labor organizations. During the week all of the school children of the city attended in a body, and special meetings were held under the auspices of fraternal and benevolent societies, the Board of Trade, church organizations and the Y. M. C. A. The campaign closed with the mass meeting on Friday night, which 1,684 people attended.

The medical meeting in connection with this campaign was held under the auspices of the Lockport Academy of Medicine at the home of Dr. F. J. Baker. Dr. John H. Pryor of Buffalo, on

behalf of the State Department of Health delivered a paper on "The Diagnosis of Early Pulmonary Tuberculosis." There was an attendance of 23 physicians at this meeting.

Amsterdam was the third city to be visited by the large exhibit and there, as in the other campaigns, the opening meeting occurred on Sunday, but the number of days was extended to seven instead of six as in the two previous campaigns. The usual program was followed throughout the campaign. The mass meeting on Friday night brought out about 1,400 people to hear the following speakers: Rt. Rev. Monsignor J. L. Reilly of Schenectady, Prof. Chas. McClumpha of Amsterdam, the Hon. Alec H. Seymour of the State Department of Health and the Hon. Jas. H. Mitchell, M. D. of Cohoes. Hon. Seeley Conover, mayor of the city, presided.

The medical meeting usually held during the campaign could not be arranged at that time, but was held on March 24th while the interest in tuberculosis was still keen. Dr. A. H. Garvin, Superintendent of the New York State Hospital at Ray Brook talked on the subject of "The Early Diagnosis of Tuberculosis" and luncheon was served by the Montgomery County Medical Society, under whose auspices this meeting was held. There was an attendance of 54 physicians at this meeting.

Sunday, March 6th, was the opening day of the Watervliet campaign, which was continued until Saturday, March 12th. It was necessary to engage two halls for the exhibit and meetings, and arrangements were finally made whereby the new city hall was used on March 6th, 7th, 8th and 9th and St. Bridget's Hall on March 11th and 12th, there being no meetings held on March 10th. It was impossible to arrange a mass meeting, because no central auditorium could be secured, otherwise the usual program was adopted.

Dr. A. T. Laird of Albany was the speaker at the medical meeting which was held at the home of Dr. B. J. Ward on the evening of March 10th. Dr. Laird had for his subject "The Diagnosis of Early Pulmonary Tuberculosis."

The fact that there were no daily newspapers in Watervliet made the publicity difficult, but in spite of this fact 32.2 per cent. of the population was reached.

The fifth place to be shown the exhibit was Glens Falls. The dates fixed were from April 3d to 8th, inclusive. The Glens Falls Committee for the Prevention of Tuberculosis collected $200 from the citizens to carry on the local work. The usual program was followed throughout, ending with the mass meeting at which Col. J. A. Cunningham presided. Dr. F. G. Fielding, Hon. Philip V. Danahy, Hon. J. A. Kellogg and Mr. C. W. Fetherolf spoke.

The medical meeting on tuberculosis was held prior to the campaign. At this meeting Dr. A. H. Garvin, Dr. A. T. Laird and Dr. H. D. Pease spoke.

From April 3d the active campaign work was not renewed until September 25th, when Saratoga was made the scene of activity. This campaign covered but five days and here again the usual program was followed. The mass meeting, however, was held on Wednesday instead of the closing night, and a large audience of 2,000 people assembled to hear Dr. E. R. Baldwin of Saranac Lake, Hon. Homer Folks of New York and the Hon. E. A. Merritt address this meeting. Mr. John A. Kingsbury of New York presided.

From Saratoga the campaign extended to Plattsburg, where a six day warfare was again waged. Special military meetings were the feature of the week. The campaign closed on Friday night, October 15th, with a rousing meeting, at which L. L. Shedden presided. Addresses were made by the Hon. C. C. Duryee of Schenectady, Dr. Wm. J. Brennan, President of the Board of Health of Plattsburg, the Rt. Rev. Father Reilly of Schenectady and Mr. C. W. Fetherolf of this Department. This campaign was notable in being the first campaign of this sort in which soldiers of the regular army of the United States have participated. The medical meeting was omitted because it was impossible to secure any physician to give the usual demonstration.

From October 30th to November 4th the exhibit was shown in Malone, and it was there that the record percentage attendance was secured. Seventy-seven per cent. of the population was registered as entering the State Armory during the campaign. This town, although right in the territory influenced by Saranac Lake and the intelligence coming from that tuberculosis center,

has been for years very negligent in public health matters, and tuberculosis was not considered at all. A slight interest had been aroused just previous to the campaign, so that it seemed the psychological moment for such a campaign to be carried on. Its effect was remarkable and as a result a tuberculosis nurse was engaged and a free examination station established. This town is a striking example and a proof positive of the educational value of this exhibit in public health work other than that pertaining to tuberculosis. A recent visit to this town shows better hygienic and sanitary conditions throughout and an increased activity of the board of health and health officer along all lines of public health. The usual program was carried out during the six day campaign and the mass meeting was a fitting close. Dr. E. R. Baldwin of Saranac Lake, Dr. Lawrason Brown of Saranac Lake, Dr. John B. Huber of New York, Mr. M. E. McClary, President of the Board of Trustees of the State Hospital at Ray Brook, Hon. J. P. Badger, Mr. C. W. Fetherolf of the State Department of Health and Mr. G. J. Nelbach of New York were the list of speakers. The Hon. F. G. Paddock presided.

Owing to the fact that the Franklin County Medical Society usually devotes most of its scientific program to tuberculosis, the usual medical meeting was dispensed with.

From Malone the exhibit went to Ogdensburg, where it exhibited in the State Armony from November 22d to December 2d. Here again the usual program was followed and the week's campaign was closed by the mass meeting, at which Major W. H. Daniels presided. Dr. E. R. Baldwin, Mr. John A. Kingsbury, Hon. F. J. Gray and Dr. G. C. Madill were the speakers. The medical meeting usually held at the time of the campaign, in this instance preceded the exhibit Dr. A. H. Garvin gave a clinical demonstration of the diagnosis of early tuberculosis.

The year 1910 closed its campaign work with a visit to Watertown, the campaign being conducted there from December 11th to 16th. Friday night, December 16th was called "Watertown Night" and nearly 1,000 people turned out in spite of the severe weather to hear Dr. Henry L. Elsner of Syracuse, Mr. W. H. Stevens of Watertown, Mr. Geo. J. Nelbach of New York and Mr. Philip V. Danahy of Albany.

These ten local campaigns can be considered the most successful yet undertaken, and the following figures seem to warrant this statement:

There has been a total attendance of 55,169. The average per cent. of the population reached has been 37.66 per cent. There have been held 133 meetings; 50 of these meetings were for school children, 10 women's meetings, 10 meetings for fraternal organizations, 9 meetings for labor organizations, 9 mass meetings, 7 joint public meetings, 3 meetings under the auspices of business organizations, 9 meetings for foreigners, 16 church meetings, 4 military meetings and 8 medical meetings. There have been distributed approximately 132,705 pieces of literature. Newspaper space used for publicity has amounted to 51,085 column inches. There have been 232 speakers at the various meetings, 134 of which have been physicians and 98 others.

The plan of the campaign has been practically the same as that of the year 1909, and the results should be most gratifying. The movement seems to have become a very popular one and because of this fact local co-operation and endorsement are much easier to secure. The clergy seem more willing to unite on wiping out this social evil and physicians have assisted us greatly. Labor organizations are very active and their help can always be depended upon. Through the meetings held under the auspices of the women's clubs, local health laws and ordinances are enforced and new ones instituted and we have come to place great dependence on them as the best means to secure these results. Practically all fraternal and benevolent organizations have been instructed by the officers of their order to lend all possible assistance to the movement and they are obeying these instructions. Much credit for the success of this work is due to the co-operation of the editors of the newspapers throughout the State.

The medical meetings which have been held in connection with the local campaigns have proved to be one of the most effective ways of giving to the physician in general practice the essentials of diagnosis of tuberculosis. So much has been done through magazine articles during the past few years that it is not uncommon for the physician to refuse to read the articles that are appearing because they are merely reviews and contain no new

facts. The demonstrations given by this Department are practical and each physician has an opportunity to examine and familiarize himself with the essentials of diagnosis. The Department has been especially fortunate in the men who have been its representatives in this particular work. Much credit belongs to Dr. John H. Pryor of Buffalo, and Dr. A. H. Garvin, Superinintendent of the New York State Hospital at Ray Brook, who have given their time and ability for this purpose. Their lectures and demonstrations are very popular with the physicians and much good has been accomplished through their efforts. If I might be permitted to recommend one thing for the coming year which I feel is one of the most important that the Department might undertake in this work, I would respectfully suggest that this particular work with the physicians be continued more extensively than heretofore. It has been proved that it is the ideal way to instruct the physicians in a field of knowledge in which it must be admitted that they are woefully lacking.

The six small exhibits built by this Department during the summer have been used very effectively throughout the counties, visiting the smaller towns and villages. Six demonstrators were secured and an active county hospital campaign was carried on jointly with the State Charities Aid Association. The year's reports show that these six small exhibits have visted 131 towns and villages in 17 different counties. In connection with these county campaigns, there have been held 361 meetings, 112 of which have been for the school children. There has been a total attendance at these meetings of 41,409; 425 speakers have addressed the various gatherings. These exhibits have been responsible for securing provision for county hospitals in 16 counties and 18 other boards of supervisors are seriously considering this question.

From the knowledge which we have there is no doubt that hospitals are the best solution for the tuberculosis problem, but there is also no doubt but that they will never prove the success that is expected unless they are in charge of a competent physician who must be a resident physician and who will devote all his time to the institution, and each institution should have regular and systematic inspection by this Department.

The small exhibits have been used largely to secure county hospitals but aside from this object in which they have been very successful, their educational value cannot be over-estimated. The rural districts are the communities which our statistics show need most education in regard to tuberculosis and the value of these exhibits has never been in doubt.

The work of the summer months was given over to the reconstruction of the large exhibit and the building of six county campaign exhibits. The itinerary for the year 1910 and 1911 was planned at this time and the following cities were placed on the list of cities to be visited by the large exhibit; Saratoga, Plattsburg, Malone, Ogdensburg, Watertown, Little Falls, Gloversville, Johnstown, Ithaca, Batavia, Hornell, Oneonta, Hudson.

Kindest co-operation has been met with by each and all in the Department and it is largely through their interest that the Campaign has proved the success that it has this year past.

Respectfully submitted,

E. G. WHIPPLE, M. D.,

Director Tuberculosis Exhibit

REPORT

OF THE

ANTITOXIN LABORATORY

REPORT OF THE ANTITOXIN LABORATORY

ALBANY, N. Y., *April* 19, 1911.

HON. EUGENE H. PORTER, A.M., M.D., *State Commissioner of Health, Albany, N. Y.:*

SIR:— I have the honor to submit to you a report of the work of the Antitoxin Laboratory for the year 1910.

For purposes of comparison, the general statements of the activity of the Antitoxin Laboratory are made in tabular form corresponding to those of reports of this service in preceding years.

The total amount of diphtheria antitoxin distributed during 1910, consists of 36,916 bottles of diphtheria antitoxin of 1,500 units each or equivalent. The character and total number of places supplied during the year is shown in the following table, which covers the period from 1902:

YEAR	1902	1903	1904	1905	1906	1907	1908	1909	1910
Cities supplied	30	42	42	42	42	42	43	47	53
Villages supplied	161	204	617	691	793	828	926	169	168
Towns supplied	171	280						273	232
Total	362	526	659	733	835	870	969	489	453

Of this amount of diphtheria antitoxin, a total of 55,374,000 units, the proper form of requisition has been filled in and is duly filed for 45,236,000 units, showing a balance of 10,138,000 units of diphtheria antitoxin distributed during that year in some manner other than the usual form of signed requisition. For 33,480,000 units of this year's distribution of diphtheria antitoxin, receipts in due form have been returned to this Department and are filed. Reports of the use of 18,578,943 units of diphtheria antitoxin more or less completely filled out and signed have been forwarded to this Department and are on file. In addition thereto, 2,751,000 units of diphtheria antitoxin are represented by report slips received by the Laboratory perfectly

blank, generally returned with a package containing an empty syringe of antitoxin and without any address of sender which would make possible the identification or trace of the person supplied with the antitoxin used in these cases.

Among the reports of diphtheria antitoxin utilized it is found that this therapeutic agent was used in thirty-five cases that were other than diphtheria.

Reports of the utilization of the State antitoxin are at hand for 1,863 cases of diphtheria, of which 1,700 recovered and 163 died; 3,921 cases were immunized.

The mortality, therefore, of all reported cases of diphtheria with the use of the State antitoxin for 1910, is 8.8 per cent.

The relative amount of the distribution of 1910, with that of previous years since 1902, is shown by the following table, which is a continuation of Table II of the reports of previous years:

	Bottles
Nine months of 1902	6,552
Full year, 1903	14,121
Full year, 1904	16,374
Full year, 1905	16,308
Full year, 1906	17,794
Full year, 1907	23,629
Full year, 1908	25,469
Full year, 1909	24,429
Full year, 1910	36,916

The relative strength of serum issued this year, compared to that of previous years, is shown in the following table:

1902	300 units per cubic centimeter
1903	325 units per cubic centimeter
1904	375 units per cubic centimeter
1905	350 units per cubic centimeter
1906	350 units per cubic centimeter
1907	450 units per cubic centimeter
1908	350 units per cubic centimeter
1909	370 units per cubic centimeter
1910	530 units per cubic centimeter

Of all the cases reported, involving a total of over 18,000,000 units of diphtheria antitoxin, approximately 5,000,000 units of antitoxin were used for immunizing purposes, 11,700,000 units for purposes of cure, and 1,800,000 units of antitoxin were used in lethal cases.

Special study of the most thoroughly reported series of antitoxins utilized during the year, showed that for 3,921 cases immunized, 5,000,000 units of antitoxin were used, showing the utilization of an average dose of 1,530 units.

Of this same series of antitoxin utilization, 163 deaths were reported, for which 1,800,000 units of diphtheria antitoxin had been utilized, showing an administration of 19,000 units per case of the deaths reported.

Of 1,700 cases of reported recoveries in this same series, a total of 11,700,000 units are shown to have been utilized; an average amount of under 7,000 units of antitoxin per case for those in the series that recovered from diphtheria.

A considerable number of State institutions were supplied with both diphtheria and tetanus antitoxins. A total of more than 2,600,000 units of diphtheria antitoxin is reported as supplied during 1910 to State institutions, of which practically 675,000 units were supplied for purposes of immunization. Approximately, therefore, 2,000,000 units were supplied for therapeutic use in these State institutions.

Tetanus Antitoxin

It is very noticeable that many health officers fail to keep antitoxins on hand, and tetanus antitoxin in particular; and the mortality statistics of the State from tetanus, showing 111 deaths in the year, do not indicate that a sufficiently extensive distribution or, at least, utilization of tetanus antitoxin exists.

A total of 14,482,500 units of tetanus antitoxin was distributed during the year, and requisitions to the amount of slightly over 6,492,000 units of such antitoxin are in proper form and duly filed. The form of requisition is lacking for 7,990,000 units of State antitoxin. The receipts required from such physicians as have utilized the State antitoxin are at hand and filed for 1,301,000 units of tetanus antitoxin, and reports of its use to the amount of 2,276,400 units have been received and filed.

Of actual cases of developed tetanus subjected to State antitoxin treatment, there are reported only fourteen cases, nine deaths and five recoveries.

Of 2,276,400 units for the utilization of which sufficient reports exist, it is found that 326,400 units were used for prophylactic purposes, and that 1,950,500 units of such antitoxin were used for treating actual cases of tetanus.

Approximately 3,225,000 units of tetanus antitoxin were supplied to 31 cities in the State; 11,257,500 units to 83 towns and 67 villages and 18,000 units of tetanus antitoxin were furnished to the State institutions.

During the year 1910, the Laboratory Division has continued the work of preparing and distributing the outfits furnished by the State Department of Health for the purpose of prophylaxis of ophthalmia neonatorum. Quantities were supplied as the demand and utilization of these outfits indicated the necessity, to the amount of 24,454.

Respectfully submitted

WILLIAM S. MAGILL,

Director of Laboratories

REPORT

OF THE

HYGIENIC LABORATORY

REPORT OF HYGIENIC LABORATORY

[illegible]

[illegible]

[illegible]

Respectfully,

WILLIAM S. [illegible]

[illegible]

Table of Analytical Results of Samples of Water Obtained from Public Supplies or Supplies Used by Public Institutions

RESULTS IN PARTS PER MILLION

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Adams	Tap, public supply	11/18/10	3	Trace	180	142	.004	.072	.001	1.20	2.00	140.0	133.0	0.50					
Addison	Tap, public supply	7/16/10	4	10	190	163	.004	.086	.010	0.60	9.75	120.0	115.0	1.10	300	+	+	—	
Addison	Tap, public supply	9/16/10	8	Trace	126	91	.014	.122	.002	0.16	7.00	80.0	79.0	1.45	300	+	+	+	
Addison	Tap, public supply	11/ 1/10	8	Clear	171	122	.014	.060	Trace	0.30	8.00	100.0	99.0	0.30	850	+	+	—	
Addison	Tap, public supply	12/ 9/10	3	Clear	140	120	.008	.038	Trace	0.20	6.00	84.3	77.0	0.10	450	+	—	—	
Afton	Tap, public supply	7/21/10	Trace	Clear	70	58	.012	.014	.001	0.30	1.25	54.3	53.0	0.20	100	—	—	—	
Afton	Tap, public supply	11/ 2/10	Trace	Clear	66	59	.008	.016	Trace	0.50	1.00	40.3	39.0	0.10	45	—	—	—	
Akron	Tap, public supply	12/16/10	Trace	Clear	1,840	1,454	.008	.010	.002	1.00	12.00	130.0	231.0	0.40	150	+	—	—	
Albany	Raw Hudson river water	3/ 2/10	15	350	140	99	.086	.262	.003	0.40	2.00	44.3	43.0	6.60	16,000			+	—
Albany	Water applied to slow sand filters	3/ 2/10													3,900		+	+	
Albany	Water after complete treatment	3/ 2/10	18	3			.070	.086	.003	0.40	2.25	48.6	44.0	3.50	450	+	—		
Albany	Raw Hudson river water	4/15/10	15	20	104	82	.020	.058	.003	0.20	2.00	48.6	48.0	5.30	10,500			+	+
Albany	After passing preliminary filters	4/15/10													250		+	+	
Albany	Water after complete treatment	4/15/10	15	Clear	92	63	.002	.042	.001	0.20	2.25	47.1	45.0	5.20	14	—	—		
Albany	Tap, Tivoli gravity supply	4/15/10	12	25	137	98	.012	.070	.001	0.20	6.50	68.6	64.0	5.50	500	+	—	—	
Albany	Raw Hudson river water	6/16/10	20	12	120	87	.072	.110	.010	0.20	1.25	62.9	62.0	6.20	6,800			+	+
Albany	Prefiltered water applied to slow sand filters	6/16/10													750	+	+		
Albany	Pure water, well	6/16/10	18	Clear	105	75	.014	.086	Trace	0.20	1.25	58.6	57.0	5.40	42	—	—		
Albany	Raw Hudson river water	7/25/10													16,000			+	+
Albany	Prefiltered water applied to slow sand filters	7/25/10													280		+	+	
Albany	Pure water, well	7/27/10													13	+	—		
Albany	Raw Hudson river water	8/23/10	40	8	130	75	.038	.208	.005	0.06	3.40	61.4		16.5	7,600			+	+
Albany	Prefiltered water applied to slow sand filters	8/23/10													690		+	+	
Albany	Filter effluent, unit No. 8	8/23/10	35	Trace	119	75	.006	.082	.003	0.06	3.00	61.4		19.2	50	+	—		
Albany	Raw Hudson river water	9/30/10	35	15	184	88	.030	.200	.013	0.10	5.50	82.9	78.0	16.0	5,800			+	+

Albany	Prefiltered water applied to slow sand filters	9/30/10													230		+	—	
Albany	Pure water, well	9/30/10	30	Clear	166	85	.012	.074	.006	0.06	5.25	78.6	71.0	7.60	16	—	—		
Albany	Raw Hudson river water	11/3/10	35	15	133	99	.028	.102	.003	0.04	3.25	60.0	55.0	18.00	8,300			+	+
Albany	Prefiltered water applied to slow sand filters	11/3/10													1,300		+	+	—
Albany	Pure water, well	11/3/10	35	Trace	123	83	.010	.060	.001	0.04	3.25	68.6	57.0	10.80	85	+	+	—	
Albany	Raw Hudson river water	11/30/10	25	200	149	89	.048	.136	.004	0.02	3.75	74.3	73.0	16.30	125,000			+	+
Albany	Prefiltered water applied to slow sand filters	11/30/10													7,800	+	+	+	
Albany	Pure water, well	11/30/10	25	Clear	140	93	.018	.096	Trace	0.02	4.00	75.7	72.0	8.00	18	—	—	—	
Albion	Tap, public supply	2/16/10	Trace	Clear	353	262	.008	.012	.002	Trace	14.75	203.0	162.0	1.20	60	—	—	—	
Albion	Tap, public supply	6/23/10	Trace	Clear	340	233	.018	.032	.001	1.60	13.25	188.5	178.0	1.00	4,500	—	—	—	
Albion	Tap, public supply	10/14/10	Trace	Trace	340	263	.006	.048	.001	2.00	14.00	188.5	169.0	0.60	20	—	—	—	
Albion	Tap, institution supply	11/25/10	Trace	Clear	351	279	.012	.066	.001	1.60	15.25	182.0	174.0	1.80	750	—	—	—	
Albion	Tap, public supply	12/17/10	Trace	Trace	382	280	.006	.072	.003	2.88	12.75	191.4	184.0	2.55	950	—	—	—	
Alexandria Bay	Stand pipe water, public supply	8/23/10	3	Trace	98	42	.016	.084	.001	0.08	7.12	85.7	79.0	0.80					
Alexandria Bay	Pumped to reservoir, public supply	8/23/10	Trace	Clear	149	97	.008	.070	.001	0.08	7.12	84.3	80.0	0.50					
Alexandria Bay	Artesian well, Crossman house	8/24/10	20	27	318	214	.042	.102	.003	0.12	21.75	188.6	179.0	4.48	17,000	+	—	—	
Alexandria Bay	Untreated St. Lawrence river water	8/30/10													800	+	—	—	
Alexandria Bay	St. Lawrence river water after having passed through private filter	8/30/10													400	—	—	—	
Alexandria Bay	Tap in Marsden house	8/31/10	1	1	140	99	.014	.098	.002	0.04		95.70	93.0	0.88	1,300	+	—	—	
Alfred	Tap, public supply	3/19/10	Trace	Clear	146	120	.008	.010	.003	1.60	1.50	105.8	92.0	0.50	80	—	—	—	
Alfred	Tap, public supply	10/6/10	Trace	Clear	222	183	.004	.040	Trace	0.50	0.75	168.6	164.0	0.20	50	+	—	—	
Alfred	Tap, public supply	12/12/10	5	2	200	149	.012	.012	.001	1.00	1.00	131.4	128.0	1.00	160	+	—	—	
Allegany	Tap, public supply	1/28/10													45	—	—	—	
Allegany	Tap, public supply	3/21/10	Trace	Clear	131	114	.012	.018	.002	0.30	1.25	111.4	108.0	0.80	1,850	—	—	—	
Allegany	Tap, public supply	10/7/10	5	Trace	136	107	.006	.022	Trace	0.70	1.75	100.0	106.0	0.20	30	—	—	—	
Allegany	Tap, public supply	12/13/10	Trace	Trace	139	118	.008	.010	.001	0.72	1.50	114.2	114.0	0.40	100	+	—	—	
Altamont	Tap, public supply	2/1/10	10	14	168	141	.026	.070	.001	0.80	2.00	105.8	80.0	2.50	2,300	+	+	—	
Altamont	Tap, public supply	11/5/10	5	5	168	138	.004	.130	.001	Trace	1.50	137.2	131.0	3.50	240	+	+	—	
Amenia	Tap, public supply	9/6/10	Trace	20	154	110	.006	.024	.001	0.40	3.50	108.6	96.0	1.50		+	+	+	
Amenia	Overflow from pump, public supply	10/6/10	Trace	Clear	306	223	.010	.020	.002	6.40	6.50	214.5	194.0	0.20	40	—	—	—	
Amenia	Tap, public supply	10/6/10													325	+	—	—	
Amenia	Overflow from well, public supply	10/6/10													140	+	—	—	
Amenia	Tap, pump house, 2 P. M.	10/25/10									5.50				11	—	—	—	
Amenia	Tap, pump house, 3 P. M.	10/25/10									5.25				30	—	—	—	
Amenia	Tap, pump house, 4 P. M.	10/25/10									5.25				11	—	—	—	
Amenia	Tap, pump house, 5 P. M.	10/25/10									5.75				7	—	—	—	
Amenia	Tap, pump house, 6 P. M.	10/25/10									6.00				31	—	—	—	
Amenia	Tap, pump house, 7.30 P. M.	10/25/10									6.12				10	—	—	—	
Amenia	Tap, Miller's blacksmith shop, 8.30 A. M.	10/26/10													80	+	+	—	
Amsterdam	Tap, 130 East Main street	3/5/10	50	Trace	60	33	.018	.148	.003	0.30	1.00	26.0	23.00	8.90	3,470,000	+	+	—	
Amsterdam	Tap, 336 Locust street	3/5/10													7,800	+	—	—	
Amsterdam	Tapping reservoir	3/5/10													4,000,000	+	—	—	
Amsterdam	City distributing reservoir	3/5/10													1,500	+	—	+	
Amsterdam	City distributing reservoir	4/18/10													23,500	—	—	—	

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (−=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Amsterdam	Apron at entrance of reservoir	4/18/10	45	3	64	33	.010	.138	.003	0.20	0.75	24.7	19.0	7.00	550	−	−	−	..
Amsterdam	Tap, public supply	6/30/10	70	10	54	27	.004	.122	.001	0.40	0.75	20.8	15.0	11.20	1,200	+	−	−	..
Amsterdam	Tap, public supply	9/ 7/10	60	1	46	19	.010	.140	Trace	0.40	0.37	18.2	10.0	7.90	1,200	..	+	+	
Amsterdam	Tap, public supply	10/29/10	70	50	54	22	.006	.096	.001	0.24	0.75	20.8	13.0	10.10	150	+	−	−	..
Amsterdam	Tap, public supply	12/29/10	40	Trace	65	27	.080	.238	.001	0.04	0.50	15.6	8.0	1.50	210	+	−	−	..
Andover	Tap, public supply	3/18/10	Trace	Clear	43	27	.004	.006	.001	1.20	1.25	20.8	15.5	1.00	20	−	−	−	..
Andover	Tap, public supply	10/ 6/10	Trace	Clear	36	16	.004	.008	Trace	0.70	1.25	14.3	13.0	1.10	250	+	−	−	..
Andover	Tap, public supply	12/12/10	Trace	Clear	54	36	.016	.014	.001	1.20	1.25	20.8	16.0	0.70	220	+	−	−	..
Angelica	Tap, public supply	10/ 8/10	Trace	Clear	90	62	.004	.012	.002	3.00	3.25	60.0	59.0	0.10	140	−	−	−	..
Angelica	Tap, public supply	12/14/10	Trace	Trace	89	64	.004	.006	.001	1.00	2.50	62.9	60.0	0.90	30	−	−	−	..
Arcade	Tap, public supply	5/27/10	Trace	Clear	152	116	.010	.008	.002	0.80	1.25	98.6	93.0	0.30	10	−	−	−	..
Arcade	Tap, public supply	10/13/10	Trace	Clear	143	117	.004	.018	.001	0.50	1.12	98.6	98.0	0.20	700	+	−	−	..
Ardsley	Raw Pocantico water	1/14/10	...	...	...	...	...	...	...	...	...	...	...	...	74,000	+	+	+	..
Ardsley	Pocantico lake filtered. Tap in pump-room	1/14/10	15	2	86	67	.014	.052	.003	0.60	3.75	33.8	10.0	3.50	7,200	+	+	−	..
Ardsley	Raw Pocantico water	3/12/10	15	10	61	41	.024	.056	.002	0.20	3.25	28.6	11.0	2.80	5,600	...	+	−	..
Ardsley	Pocantico water (filtered)	3/12/10	...	...	...	...	...	...	...	...	...	...	6.50	...	45	−	−	−	..
Ardsley	Pocantico river above Scarboro stream	4/18/10	...	...	...	...	...	...	...	...	...	...	...	...	6,900	+	+	−	..
Ardsley	Scarboro stream	4/18/10	...	...	...	...	...	...	...	...	...	...	...	...	1,200	+	−	−	..
Ardsley	Pocantico lake raw water	4/18/10	5	3	76	47	.044	.068	.005	0.30	3.50	36.4	28.0	2.00	300	+	−	−	..
Ardsley	Filtered water. Pumping station	4/18/10	...	...	...	...	...	...	...	...	...	...	...	...	500	+	−	−	..
Ardsley	Pocantico lake raw water	4/28/10	10	30	56	29	.050	.162	.001	0.30	3.25	18.2	9.00	2.40	56,000	+	+	+	..
Ardsley	Filtered water; pump station; tap	4/28/10	...	...	...	...	...	...	...	...	...	...	3.00	...	2,100	+	+	+	..
Ardsley	Raw Pocantico water	6/27/10	35	8	106	70	.112	.112	.013	0.20	3.75	37.1	32.0	5.40	5,300	−	−	−	..
Ardsley	Treated water	6/27/10	20	5	83	54	.022	.140	.001	0.30	3.50	37.7	27.0	4.50	4,600	+	−	−	..
Ardsley	East tributary to Lake Pocantico	6/27/10	30	5	83	52	.098	.116	.007	0.20	3.75	37.7	33.0	5.00	4,300	+	+	+	..
Ardsley	Pocantico river below west tributary	6/27/10	25	5	89	57	.040	.114	.010	0.40	4.75	40.3	38.0	4.00	5,700	+	+	−	..
Ardsley	Pocantico river 700 feet above lake	6/27/10	35	6	95	59	.040	.092	.010	0.40	4.00	40.3	37.0	4.00	6,700	+	+	−	..
Ardsley	Raw Pocantico water	7/26/10	25	18	92	56	.052	.208	.002	0.18	4.75	48.6	34.0	3.50	33,000	+	−	−	..
Ardsley	Filter effluents	7/26/10	10	Trace	94	65	.034	.108	.001	0.10	5.50	42.9	29.5	2.30	500	−	−	−	..
Ardsley	Raw Pocantico water	8/ 3/10	10	18	92	70	.004	.238	Trace	Trace	5.75	39.1	36.0	2.50	2,300	+	−	−	..
Ardsley	Filtered water	8/ 3/10	5	Trace	99	82	.002	.090	.001	0.02	5.75	48.6	23.0	1.30	1,500	−	−	−	..
Ardsley	Brook, St. Joseph's Normal College	8/ 3/10	...	...	...	...	...	...	...	...	...	...	...	...	13,000	+	+	+	..

Ardsley	Tap (temporary pump), New York city water	10/21/10	15	5	7	42	.026	.228	.002	0.08	2.50	37.7	37.0	3.80	300	+	+	+
Ardsley	Tap, Ardsley pump, Croton water	11/28/10	15	15	81	49	.124	.146	.005	0.10	3.00	45.7	41.0	2.45	290	+	—	—
Ardsley	Tap, raw Pocantico lake water	11/30/10									7.00				1,200	+	+	—
Ardsley	Pocantico lake filtered water	11/30/10	20	Clear	177	121	.130	.154	.002	0.80	8.00	61.4	38.0	2.15	325	+	—	—
Auburn	Tap, public supply	2/8/10	5	2	142	126	.004	.046	.001	5.60	1.37	105.8		2.51	120	—	—	—
Auburn	Tap, public supply	3/30/10	5	12	146	127	.004	.074	.003	0.70	1.12	97.2		2.60	800	—	—	—
Auburn	Tap, public supply	4/18/10	3.0	15	142	122	.002	.082	.001	0.60	1.75	97.2		2.20	70	—	—	—
Auburn	Tap, public supply	5/18/10	5	10	128	100	.006	.062	.002	0.50	1.75	94.2		2.65	40	—	—	—
Auburn	Tap, public supply	5/26/10													20	+	—	—
Auburn	Tap, public supply	6/26/10	Trace	Clear	138	101	.002	.046	.001	0.30	1.25	95.7	93.0	1.50	340	—	—	—
Auburn	Tap, public supply	9/7/10	Trace	2	142	102	.002	.094	.001	0.30	1.75	92.9	92.0	1.30	90	+	+	—
Auburn	Tap, public supply	10/5/10	Trace	Clear	138	110	.016	.034	.001	0.50	1.00	91.4	88.0	0.70	15	—	—	—
Auburn	Tap, public supply	10/22/10	5	Trace	139	100	.010	.064	.001	0.40	1.25	91.4	91.0	0.40	10	—	—	—
Aurora on Cayuga	Well, Wells College	2/1/10	Trace	3	395	299	.010	.026	.002	0.60	4.25	264.5	253.0	0.70	22,500	—	—	—
Avoca	Tap, public supply	5/31/10	Trace	Clear	171	135	.016	.054	.001	1.60	1.50	128.6	133.0	0.40	35,000	—	—	—
Avoca	Tap, public supply	7/16/10	Trace	Trace	175	135	.008	.038	Trace	1.60	0.75	131.4	132.0	0.50	53,000	+	+	—
Avoca	Tap, public supply	9/17/10	Trace	Clear	176	137	.022	.030	.001	1.60	1.25	131.4	129.0	0.30	39,000	+	—	—
Avon	Tap, public supply	2/12/10	5	Clear	182	127	.020	.118	.005	0.10	15.25	111.4	109.0	2.40	170	—	—	—
Avon	Tap, public supply	3/15/10	Trace	Clear	181	140	.008	.076	.002	Trace	14.25	114.2	96.5	2.40	1,200	+	—	—
Avon	Tap, public supply	7/14/10													1,100	—	—	—
Avon	Tap, public supply	9/19/10	3	3	188	113	.008	.122	.002	Trace	15.25	105.8	97.0	1.64	10,000	+	+	—
Bainbridge	Tap, public supply	7/21/10	1	Trace	58	46	.004	.052	Trace	Trace	0.37	31.2	25.5	0.60	300	—	—	—
Bainbridge	Tap, public supply	11/2/10	Trace	Clear	41	31	.328	.024	.001	.20	1.75	18.2	12.0	0.10	160	—	—	—
Baldwinsville	Tap, public supply	1/18/10	0	Trace	307	246	Trace	.010	.001	.06	15.60	214.5		.10	90	—	—	—
Baldwinsville	Tap, public supply	4/21/10	Trace	Clear	249	203	.002	.008	.001	.40	11.50	157.2		.92	20	—	—	—
Baldwinsville	Tap, public supply	5/26/10	Trace	Clear	285	214	.006	.010	.001	2.80	10.50	208.0	155.0	.90	7	—	—	—
Baldwinsville	Tap, public supply	6/28/10	Trace	Clear	263	207	.002	.044	.001	1.60	10.25	174.2	154.0	0.30	60	—	—	—
Baldwinsville	Tap, public supply	9/21/10	Trace	Clear	327	169	.004	.026	.001	3.20	14.50	165.8	163.0	0.38	5	—	—	—
Baldwinsville	Tap, public supply	11/15/10	Trace	Trace	296	230	.010	.018	Trace	2.40	15.0	165.8	166.0	0.10	3,600	—	—	—
Baldwinsville	Tap, public supply	12/28/10	Trace	Clear	323	208	.020	.070	.002	3.20	13.25	185.8	172.0	0.50	50	—	—	—
Ballston Spa	Tap, public supply	11/25/10	1	1	44	35	.006	.028	.002	Trace	0.37	35.1	34.0	0.40	40	—	—	—
Batavia	Tap, public supply	2/12/10	19	12	210	146	.042	.068	.004	0.60	4.00	122.8	119.0	2.50	13,000	+	+	—
Batavia	Tap, public supply	2/14/10	19	12	210	146	.042	.068	.004	0.60	4.00	122.8	119.0	2.50	13,000	+	+	
Batavia	Tap, public supply	5/28/10	10	10	214	171	.008	.064	.002	0.10	3.25	145.8	145.0	2.10	1,700	+	+	—
Batavia	Tap, institution supply	11/19/10	Trace	Clear	376	300	.008	.028	Trace	2.00	8.25	300.0	240.0	0.10	26	—	—	—
Bath	Tap, public supply	2/28/10	Trace	Trace	215	194	Trace	.014	.002	.02	4.00	148.6		0.76	400	—	—	—
Bath	Tap, public supply	6/10/10	2	Clear	220	187	.008	.016	.002	.50	4.00	168.6	156.0	0.30	33,000	—	—	—
Bath	Tap, public supply	7/15/10	Trace	Clear	225	172	.008	.006	.001	Trace	3.75	168.6	162.0	0.30	10,000	—	—	—
Bath	Cohocton river, Soldiers' and Sailors' Home	8/27/10	2	5			.016	.054	.003	0.30	2.87	125.8	124.0	2.04				
Bath	Tap, public supply, Soldiers' and Sailors' Home	9/17/10	Trace	Clear	223	190	.012	.028	.001	.28	3.75	165.8	164.0	0.38	100	—	—	—
Bath	Spring house, Soldiers' and Sailors' Home	9/30/10	Trace	Clear	225	158	.004	.102	.001	2.56	2.75	157.2	154.0	0.93	27,000	+	+	+
Bath	Cohocton river, Soldiers' and Sailors' Home	9/30/10	8	5	172	124	.044	.104	.003	.360	5.50	120.0	120.0	1.90	4,200	+	+	+
Bath	Two drilled wells, Soldiers' and Sailors' Home	9/30/10													1,900	—	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Bath	Wells under power house, Soldiers and Sailors' Home	10/20/10	5	2	196	164	.020	.056	.001	Trace	6.00	151.4	146.0	0.20					
Bath	Tap in power house, Soldiers and Sailors' Home	11/12/10	Trace	Trace	193	159	.018	.020	Trace	.02	5.50	157.2	139.0	0.10	230	—	—	—	
Bath	Spring water, Soldiers and Sailors' Home	11/18/10	5	10	250	203	.004	.026	.002	1.00	2.25	201.5	165.0	2.20					
Bedford	Brook near pump well, New York State Reformatory	9/21/10													2,700	+	+	—	
Bedford	Pump, New York State Reformatory	9/21/10													325	+	+	—	
Bedford	Tap in laundry, New York State Reformatory	9/21/10	Trace	3	94	67	.004	.020	.001	0.30	4.25	61.4	61.0	0.38	70	+	—	—	
Belmont	Phillips creek, north branch	5/21/10	Clear	Trace	81	56	.018	.046	.005	0.20	1.25	52.9	48.5	1.00	4,900	+	—	—	
Belmont	Drilled well	5/21/10	30	200	302	173	.134	.014	.005	0.20	5.00	167.2	149.5	3.00	25,000	—	—	-	
Belmont	Tap, public supply	5/21/10													190	+	—	—	
Binghamton	Tap, public supply	5/16/10	5	Clear	91	66	.004	.056	.001	.34	4.50	50.0	48.0	1.70	17	—	—	—	
Binghamton	Raw water	5/31/10	10	2	111	70	.010	.098	.002	0.40	3.13	47.1	42.0	1.70	1,900	+	+	+	
Binghamton	Filtered water	5/31/10	5	1	92	62	.006	.058	.001	0.40	3.75	49.3	45.0	1.00	160	+	—	—	
Binghamton	Raw water	7/13/10													6,000	+	+	—	
Binghamton	Filtered water	7/13/10	1	Trace	117	96	.006	.042	.001	0.40	6.00	73.6	65.0	0.90	310	—	—	—	
Binghamton	Raw water	9/13/10	5	Trace	91	56	.008	.076	.001	.20	5.00	57.1	57.0	0.90	200	+	+		
Binghamton	Filtered water	9/13/10	5	18	108	62	.004	.068	.001	.24	4.00	57.1	52.0	0.25	20	+	—	—	
Binghamton	Raw water	10/29/10	10	2	115	102	.006	.068	.001	0.28	6.50	81.4	69.0	1.20	230	+	+	—	
Binghamton	Filtered water	10/29/10	Trace	2	118	92	.008	.050	.001	0.30	6.50	75.7	74.0	0.70	14	—	—	—	
Binghamton	Raw water	12/8/10	10	10	104	58	.010	.076	.003	0.40	5.00	57.1	54.0	2.80	210	+	+	—	
Binghamton	Filtered water	12/8/10	Trace	Clear	90	59	.008	.070	.001	0.40	5.00	54.3	45.0	1.80	30	+	—	—	
Binghamton	Tap, public supply	12/29/10	Trace	Clear	105	85	.004	.032	.001	.40	4.00	60.0	44.0	0.50	28	+	—	—	
Black River	Drake's creek, above State road, sample No. 1	5/19/10													70	—	—	—	
Black River	Youngs' spring	5/19/10	Trace	1	110	96	.012	.008	.003	1.00	1.75	71.4	68.0	1.00					
Black River	Drake's creek, proposed supply, sample No. 2	5/19/10	5	2	113	77	.004	.006	.001	1.00	1.50	75.7	72.0	1.30	5,400	—	—	—	
Black River	Drake's creek, proposed supply, sample No. 3	5/19/10													5,700	+	+	+	

Black River	Drake's creek, proposed supply, sample No. 4	5/19/10													4,000	+	—	—
Bolivar	Tap, public supply	3/21/10	Trace	Clear	89	71	.022	.022	.001	Trace	9.50	60.0	48.0	1.00	550	—	—	—
Bolivar	Tap, public supply	10/7/10	Trace	Clear	128	99	.014	.044	.004	.040	15.50	94.3	93.0	0.20	10	—	—	—
Bolivar	Tap, public supply	12/14/10	Trace	Clear	123	96	.006	.016	.001	Trace	11.75	75.7	72.0	1.40	70	—	—	—
Boonville	Intake No. 1 of reservoir	8/18/10													1,100	+	+	+
Boonville	Intake No. 2 of reservoir	8/18/10													1,100	+	—	—
Boonville	Reservoir	8/18/10													300	—	—	—
Boonville	Tap, public trough	8/18/10													1,200	+	—	—
Brewster	Tap, public supply	1/18/10	Trace	Clear	91	68	.018	.014	.001	1.40	4.75	60.0	42.0	1.00	55	+	—	—
Brewster	Tap, public supply	10/25/10	5	2	87	64	.008	.144	.002	0.10	1.75	60.0	54.0	3.15	50	+	+	—
Brewster	Tap, public supply	12/1/10	10	Trace	92	60	.006	.120	.001	0.36	3.75	58.6	58.0	1.40	3,000	+	—	—
Briarcliff Manor	Well No. 1, public supply	4/20/10													190	+	—	—
Briarcliff Manor	Well No. 2, public supply	4/20/10													400	—	—	—
Briarcliff Manor	Well No. 3, public supply	4/20/10	Trace	Clear	200	152	.008	.022	.004	1.60	6.00	88.6	64.5	1.30	230	+	—	—
Briarcliff Manor	Well No. 4, public supply	4/20/10													5,100	—	—	—
Briarcliff Manor	Well No. 5, public supply	4/20/10	Trace	Trace	125	82	.008	.220	.010	1.00	7.50	62.9	63.5	1.10	550	—	—	—
Briarcliff Manor	Well No. 1, public supply	7/22/10													3,100	—	—	—
Briarcliff Manor	Well No. 2, public supply	7/22/10	Trace	Clear	99	81	.012	.030	.004	0.50	4.50	77.1	69.5	0.10	1,800	—	—	—
Briarcliff Manor	Well No. 3, public supply	7/22/10													9,200	—	—	—
Briarcliff Manor	Well No. 4, public supply	7/22/10													15,000	—	—	—
Briarcliff Manor	Well No. 5, public supply	7/22/10	Trace	Clear	98	78	.002	.004	.001	0.40	0.50	75.7	49.50	0.50	16,500	—	—	—
Brockport	Natural spring (sample No. 1)	10/14/10	Trace	5	302	236	.002	.026	.004	0.80	2.00	234.0	220.0	0.80	210	+	+	—
Brockport	Natural spring (sample No. 2)	10/14/10	Trace	Trace	280	197	.002	.018	.005	0.60	3.00	177.2	170.0	0.60	650	+	+	+
Brocton	Tap, public supply	3/22/10	10	8	75	56	.044	.068	.005	0.40	1.00	29.0	28.0	2.30	550	+	—	—
Buffalo	Tap, public supply	6/21/10	Trace	1	150	111	.004	.028	.003	0.10	7.75	91.4	88.0	1.00	5,100	+	—	—
Buffalo	Tap, public supply	12/16/10	5	80	183	161	.026	.136	.015	Trace	7.75	122.8	116.0	5.30	950	+	+	—
Burke	Tap, public supply	2/1/10	Trace	Clear	80	60	.028	.024	.003	1.60	0.87	60.0	54.0	0.50	220	—	—	—
Burke	Tap, public supply	11/12/10	Trace	Clear	91	67	.008	.042	.002	4.80	1.25	60.0	58.0	0.50	70	+	—	—
Caledonia	Tap, public supply	2/12/10	1	Trace	1,168	980	.024	.032	.005	3.60	70.00	600.0	192.0	0.40	33	—	—	—
Caledonia	Tap, public supply	5/28/10	Trace	Clear	652	440	.008	.010	.001	3.60	3.90	343.0	198.0	0.30	10	—	—	—
Cambridge	Tap, public supply	12/16/10	Trace	Clear	114	92	.008	.006	.002	0.24	1.00	91.4	91.0	0.50	350	—	—	—
Camden	Tap, public supply	7/30/10	12	5	89	54	.006	.060	.001	0.40	0.50	55.7	40.0	3.50	600	+	—	—
Camden	Tap, public supply	11/19/10	20	1	74	52	.006	.036	.001	0.60	1.25	50.0	48.0	2.50	650	+	+	—
Canajoharie	Tap, public supply	4/6/10	Trace	Clear	471	386	.014	.018	.001	0.20	38.62	293.0	211.0	0.70	325	—	—	—
Canajoharie	Tap, public supply	6/30/10	Trace	Clear	456	377	.008	.014	.005	0.20	32.00	264.5	220.0	0.40	190	—	—	—
Canajoharie	Tap, public supply	9/7/10	Trace	Trace	462	371	.004	.032	.001	0.04	40.75	235.5	205.0	0.20	270	+	+	—
Canajoharie	Tap, public supply	10/31/10	Trace	Clear	468	404	.004	.006	.001	0.20	39.50	250.0	210.0	0.20	28	—	—	—
Canajoharie	Tap, public supply	12/30/10	Trace	Clear	477	337	.002	.004	.002	0.10	39.50	278.5	220.0	1.00	20	—	—	—
Canandaigua	Tap, public supply	2/9/10	2	1	174	155	.002	.066	.003	0.26	2.25	111.4		2.55	90	—	—	—
Canandaigua	Tap, public supply	4/14/10	10	15	133	106	.008	.126	.001	0.30	2.75	100.0	91.0	3.10	60	—	—	—
Canandaigua	Tap, public supply	6/25/10	3	Trace	153	107	.022	.056	.003	0.30	2.50	105.8	103.0	2.00	6,600	—	—	—
Canandaigua	Tap, public supply	9/20/10	3	3	160	111	.010	.104	.001	0.14	3.00	95.7	92.0	1.22	200	+	+	—
Canandaigua	Tap, public supply	12/19/10	Trace	Clear	147	117	.006	.050	Trace	0.24	2.75	114.2	102.0	1.80	45	—	—	—
Canaseraga	Tap, public supply	3/18/10	1	Clear	193	152	.006	.006	.001	0.30	1.25	148.6	130.0	1.00	20	—	—	—
Canastota	Tap, public supply	2/12/10	15	60	1,021	918	.012	.046	.005	0.40	4.25	500.0	185.0	1.70	13,800	+	+	+
Canastota	Tap, public supply	5/4/10	10	18	950	750	.010	.042	.005	0.80	4.00	507.5	170.0	2.50	900	+	+	+
Canastota	Tap, public supply	7/1/10	20	140	1,140	912	.016	.202	.003	0.40	3.00	600.0	165.0	5.20	1,700	+	+	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Kingston	Effluent pipe of filter	4/21/10	9	3	33	15	.156	.128	.001	0.10	0.50	6.3	5.5	2.60	221	+	+	+	..
Kingston	High pressure, filtered	7/ 5/10	1	Trace	33	18	.004	.076	.001	0.04	0.50	11.1	11.0	1.50	75	—	—	—	..
Kingston	Low pressure, filtered	7/ 5/10	1	Trace	39	23	.062	.044	.002	0.04	1.25	14.3	13.0	0.90	150	—	—	—	..
Kingston	High pressure, filtered	10/18/10	....	....	....	....	....	....	....	....	....	....	....	....	20	—	—	—	..
Kingston	Low pressure, filtered	10/18/10	15	Trace	45	22	.002	.132	.002	0.10	1.00	22.1	21.0	3.20	60	—	—	—	..
Kingston	High pressure, filtered	12/21/10	Trace	Clear	41	20	.012	.036	.001	0.10	2.25	19.5	17.0	0.50	40	+	—	—	..
Kingston	Low pressure, filtered	12/21/10	8	Clear	40	21	.010	.022	.001	0.10	1.25	19.5	18.0	1.20	20	—	—	—	..
Lackawanna	Tap, public supply	2/16/10	10	10	140	95	.002	.026	.002	0.04	5.75	91.4	90.0	1.80	600	+	—	—	..
Lackawanna	Tap, public supply	4/23/10	1	12	124	92	.008	.042	.001	0.10	5.50	80.0	79.5	1.00	200,000	—	—	—	..
Lackawanna	Tap, public supply	6/22/10	....	....	....	....	....	....	....	....	....	....	....	....	950	—	—	—	..
Lackawanna	Tap, public supply	9/19/10	5	45	167	121	.034	.146	.003	0.02	6.75	97.2	90.0	1.74	10,500	+	+	+	..
Lackawanna	Tap, public supply	10/14/10	Trace	3	130	101	.006	.092	.002	Trace	7.25	100.0	100.0	2.10	400	+	+	+	..
Lacona	Tap, public supply	11/17/10	5	Clear	119	92	.006	.014	.003	0.60	2.25	12.7	9.5	0.30	200	—	—	—	..
Larchmont	Reservoir	7/ 4/10	20	Trace	71	40	.038	.178	.003	0.04	3.75	35.1	26.0	4.70	4,400	+	+	—	..
Larchmont	Tap, public supply	9/21/10	12	2	78	33	.016	.214	Trace	0.04	4.63	31.2	27.0	3.68	200	+	+	—	..
Larchmont	Tap, public supply	12/ 1/10	....	....	....	....	....	....	....	....	....	....	....	....	800	+	—	—	..
Le Roy	Tap, public supply	2/12/10	10	1	588	461	.056	.058	.004	0.20	15.50	371.5	264.0	4.00	210	—	—	—	..
Le Roy	Tap, public supply	5/27/10	1	Clear	567	417	.020	.068	.002	0.50	36.00	307.0	148.0	1.10	3,850	+	+	—	..
Le Roy	Well No. 1, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	15	—	—	—	..
Le Roy	Well No. 2, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	30	+	—	—	..
Le Roy	Well No. 3, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	10	—	—	—	..
Le Roy	Well No. 4, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	25	—	—	—	..
Lestershire	Tap, public supply	1/ 7/10	Trace	Trace	271	250	0.00	.010	.002	.100	12.50	214.5	....	0.29	275	—	—	—	..
Lestershire	Tap, public supply	3/ 8/10	0	Trace	185	156	Trace	.008	.001	2.00	5.00	120.0	....	0.48	350	—	—	—	..
Lestershire	Tap, public supply	5/16/10	2	Clear	194	163	.006	.008	.001	1.20	5.00	128.6	119.0	0.80	5	—	—	—	..
Lestershire	Tap, public supply	7/13/10	Trace	Clear	220	171	.004	.008	Trace	1.60	6.25	148.6	139.0	1.20	4,700	—	—	—	..
Lestershire	Tap, public supply	9/13/10	Trace	Trace	273	171	.002	.002	.001	2.40	7.75	160.0	153.0	1.10	60	—	—	—	..
Lestershire	Tap, public supply	12/ 7/10	Trace	Clear	190	166	.006	.012	Trace	1.40	6.50	128.6	125.0	0.10	320	—	—	—	..
Lima	Tap, public supply	6/24/10	Trace	Trace	313	....	.002	.026	.002	Trace	4.00	250.0	....	0.50	750	—	—	—	..
Little Falls	Tap, public supply	1/ 5/10	5	Clear	134	116	.008	.024	.001	0.30	0.75	102.8	93.5	1.40	350	—	—	—	..
Little Falls	Tap, public supply	4/ 6/10	....	....	....	....	....	....	....	....	....	....	....	....	450	+	—	—	..
Little Falls	Tap, public supply	8/30/10	30	30	124	83	.002	.110	.002	0.20	0.25	75.70	75.0	6.84	19,000	+	+	—	..
Little Falls	Tap, public supply	11/ 1/10	30	10	136	118	.012	.092	.001	0.20	1.00	102.8	101.0	2.95	600	+	+	—	..

Charlotte	Filtered water, public supply	6/24/10	Trace	Clear	137	96	.004	.050	.002	0.04	8.00	91.4	87.0	1.00	28	—	—	—	
Charlotte	Raw, Lake Ontario public water supply	9/19/10											89.0		3,900	+	+	—	
Charlotte	Filtered public water supply	9/19/10	Trace	Clear	154	95	.014	.080	.001	Trace	7.50	90.0	89.0	1.93	1,900	+	+	—	
Charlotte	Raw water	12/17/10													11,000	+	+	—	
Charlotte	Filtered water	12/17/10	5	Clear	188	126	.014	.098	.003	1.60	9.50	114.2	100.0	1.15	2,500	—	—	—	
Chateaugay	Tap, public supply	3/10/10	Trace	Clear	80	62	.010	.014	.001	1.80	1.25	60.0	57.0	0.20	550	—	—	—	
Chateaugay	Tap, public supply	11/12/10	Trace	Clear	106	79	.006	.076	.002	4.80	1.50	75.7	73.0	0.30	30	—	—	—	
Chatham	Driven wells, public supply	1/17/10	2	Clear	143	100	.018	.008	.003	1.20	6.50	78.6	60.0		275	—	—	—	
Chatham	Dug wells, public supply	1/17/10	1	Clear	150	106	.024	.002	.002	2.40	9.75	65.7	57.0		17	—	—	—	
Chatham	Tap, public supply	9/ 7/10	Trace	Clear	179	104	.002	.008	.001	2.40	11.12	78.6	57.0	0.10	430	+	—	—	
Chatham	Tap at pump station (Palmer well)	12/ 2/10	Trace	Clear	165	104	.008	.010	.001	4.00	10.50	82.9	61.0	0.70	60	—	—	—	
Cherry Creek	Proposed source of public supply, spring No. 1	8/17/10													38,000	+	+	—	
Cherry Creek	Proposed source of public supply, spring No. 2	8/17/10													100,000	+	—	—	
Cherry Creek	Spring No. 1	9/14/10													300	—	—	—	
Cherry Creek	Spring No. 2	9/14/10													2,500	+	—	+	
Cherry Creek	Springs	9/14/10	10	Trace	149	96	.004	.012	.001	0.28	2.00	80.0	73.0	0.90					
Chester	Tap, public supply	7/ 7/10	5	1	39	21	.006	.116	.001	Trace	1.25	18.2	10.0	2.00	50	+	—	—	
Chester	Tap, public supply	10/20/10	Trace	1	38	26	.004	.146	.001	Trace	1.75	24.7	14.0	1.90	500	+	+	+	
Cincinnatus	Tap, public supply	10/ 5/10	2	Clear	85	68	.018	.040	.001	.360	1.00	55.7	54.0	0.20	360	+	+	—	
Clayton	Tap in power house	9/27/10													50	+	—	—	
Clayton	Tap in office of H. J. Frame	9/27/10													60	+	—	—	
Clifton Springs	Tap, public supply	1/10/10	2	2	315	264	Trace	.018	.002	4.00	4.50	288.5		1.06	170	—	—	—	
Clifton Springs	Tap, public supply	3/10/10		Trace	319	268	.002	.018	.001	0.08	4.25	243.0		1.06	14	—	—	—	
Clifton Springs	Tap, public supply	4/14/10	3	Clear	326	260	.004	.016	.001	3.20	4.00	243.0	228.0	2.80	160	—	—	—	
Clifton Springs	Tap, public supply	6/26/10	2	Trace	319	243	.026	.022	.001	3.20	3.50	243.0	236.0	0.80	1,500	—	—	—	
Clifton Springs	Tap, public supply	9/20/10	10	5	345	239	.008	.032	.001	3.84	4.75	235.5	235.0	0.96	450	+	+	—	
Clifton Springs	Tap, public supply	12/19/10													41	—	—	—	
Clinton	Tap, public supply	1/25/10	Trace	1	800	711	.054	.050	.005	0.30	8.50	443.0	190.0	0.50	450	—	—	—	
Clinton	Tap, public supply	5/ 5/10	Trace	Clear	815	712	.010	.014	.002	0.80	7.50	450.0	200.0	0.80	190	+	—	—	
Clinton	Tap, public supply	6/21/10													1,600	—	—	—	
Clinton	Tap, public supply	11/ 1/10	5	1	1,074	964	.004	.026	.003	0.20	11.75	507.5	185.0	1.00	80	+	—	—	
Clinton	Tap, public supply	12/23/10	Trace	Trace	753	643	.020	.044	.003	0.40	5.75	44.3	173.5	1.00	275	+	—	—	
Clyde	Tap, public supply	1/ 3/10	2	Trace	305	246	.002	.012	.003	Trace	13.00	201.5		1.00	4	—	—	—	
Clyde	Tap, public supply	3/ 7/10	8	3	676	614	.016	.046	.003	Trace	13.25	165.8		2.08	17,000	+	—	—	
Clyde	Tap, public supply	4/12/10	Trace	Clear	647	549	.010	.022	.003	Trace	12.25	364.5	137.0	1.30	90	—	—	—	
Clyde	Tap, public supply	5/18/10	2	Clear	749	663	.002	.028	.003	Trace	13.50	435.5	160.0	1.40	32	—	—	—	
Clyde	Tap, public supply	9/22/10	Trace	Clear	335	254	.004	.044	.001	Trace	17.75	195.0	151.0	0.67	130	—	—	—	
Clyde	Tap, public supply	11/22/10	Trace	Clear	284	251	.014	.042	Trace	0.02	17.0	136.5	130.0	0.90	4	—	—	—	
Cobleskill	Tap, public supply	1/27/10	15	60	80	49	.066	.120	.002	1.20	1.62	45.7	31.0	3.20	49,000	+	+	—	
Cobleskill	Tap, public supply	4/26/10	3	5	57	38	.016	.082	.001	0.10	1.00	27.3	23.5	1.40	750	—	—	—	
Cobleskill	Tap, public supply	11/ 4/10	10	2	100	73	.008	.164	.001	Trace	1.00	60.0	58.0	3.50	200	+	—	—	
Cohocton	Tap, public supply	5/30/10	7	12	86	62	.016	.040	.002	1.60	2.50	37.7	29.5	1.10	40,000	+	—	—	
Cohocton	Tap, public supply	7/16/10	10	18	100	73	.002	.048	Trace	1.60	2.00	48.6	39.0	1.90	22,000	+	+	+	
Cohocton	Tap, public supply	9/19/10	5	5	161	136	.006	.036	.002	0.48	4.63	120.0	111.0	1.16	54,000	+	+	+	
Cohoes	Tap, public supply	4/14/10	20	20	80	59	.022	.062	.003	0.10	2.00	40.3	36.0	4.20	1,100	+	+	+	—
Cohoes	Tap, public supply	12/ 9/10	20	30	175	127	.128	.132	.005	0.10	5.50	97.1	92.0	2.50	13,500	+	+	+	

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Cold Spring	Tap, public supply	9/26/10	15	Trace	72	39	.022	.142	.002	0.12	2.50	38.4	36.0	2.18	850	+	+	—	..
Cold Spring	Tap, public supply	11/29/10	15	Trace	84	54	.004	.062	.002	0.02	2.50	45.7	33.0	1.60	325	+	+	—	..
Collins Center	Tap, public supply	5/26/10	Trace	Clear	193	158	.032	.018	.001	0.80	1.75	155.8	101.0	0.50	1,100	—	—	—	..
Cooperstown	Tap, public supply	9/8/10	Trace	Trace	123	103	.004	.090	.002	Trace	0.25	88.6	85.0	2.20	......	....	....	....	..
Cooperstown	Tap, public supply	10/1/10	......	......	......	......	......	......	......	......	......	......	......	......	2,800	+	—	—	..
Corning	Tap, public supply	5/31/10	Trace	Clear	335	251	.004	.002	.002	3.20	20.5	214.5	165.0	0.30	5,000	—	—	—	..
Corning	Tap, public supply	7/14/10	Trace	Clear	334	239	.008	.030	Trace	1.00	18.0	168.6	150.0	0.20	150	—	—	—	..
Corning	Tap, public supply	9/16/10	Trace	Trace	356	235	.010	.052	.001	3.20	20.0	165.8	162.0	0.20	10	—	—	—	..
Corning	Tap, public supply	11/1/10	5	Clear	340	278	.006	.018	Trace	5.60	21.0	174.2	147.0	0.10	650	—	—	—	..
Corning	Tap, public supply	12/8/10	Trace	Clear	341	233	.006	.092	.001	2.40	19.0	165.8	161.0	0.10	1,150	—	—	—	..
Cornwall	Tap, public supply	7/9/10	Trace	Trace	49	30	.006	.054	.001	Trace	2.00	19.5	15.0	1.50	1,000	—	—	—	..
Cortland	Tap, public supply	5/13/10	None	Clear	138	131	.006	.014	.001	.80	1.50	100.0	......	.40	6	—	—	—	..
Cortland	Tap, public supply	5/31/10	....	Clear	151	125	.008	.004	......	.20	3.50	114.2	110.0	.70	25	—	—	—	..
Cortland	Tap, public supply	7/19/10	Trace	Clear	170	123	.006	.022	.001	0.60	1.75	120.0	119.0	0.60	50	—	—	—	..
Cortland	Tap, public supply	9/8/10	Trace	2	158	126	.102	.028	.002	0.60	1.00	111.4	111.0	0.10	80	+	—	+	..
Cortland	Tap, public supply	12/15/10	Trace	Trace	150	120	.006	.012	Trace	.60	1.75	120.0	118.0	0.10	50	+	—	—	..
Coxsackie	Tap, public supply	2/8/10	1	2	102	93	.008	.044	.002	0.20	3.00	67.1	63.0	1.00	600	+	—	—	..
Coxsackie	Tap, public supply	3/23/10	5	3	102	80	.004	.034	.001	0.20	2.00	65.7	56.5	1.60	240	+	+	—	..
Coxsackie	Tap, public supply	12/21/10	3	Trace	201	170	.004	.022	.002	0.20	4.50	160.0	143.0	0.70	350	+	+	—	..
Croton	Tap, public supply	5/6/10	20	3	153	132	.006	.044	.001	.50	1.00	102.8	99.0	3.60	50	—	—	—	..
Crown Point	Tap, public supply	3/2/10	Trace	Clear	185	158	.010	.012	.001	0.10	1.75	148.6	141.0	0.30	18,000	—	—	—	..
Crown Point	Tap, public supply	11/10/10	Trace	Clear	180	157	.012	.018	.001	0.20	2.25	157.2	156.0	0.30	70	+	+	—	..
Cuba	Tap, public supply	3/19/10	Trace	Clear	131	126	.006	.008	.002	0.40	9.50	98.6	91.0	1.10	50	—	—	—	..
Dansville	Tap, public supply	5/28/10	Trace	Clear	140	114	.004	.048	.001	0.50	1.50	111.4	104.0	0.40	33,000	+	—	—	..
Dansville	Tap, public supply	9/19/10	5	Trace	191	135	.010	.058	.002	0.60	1.75	122.8	122.0	0.57	32,000	+	—	—	..
Deansboro	Tap, public supply	1/24/10	5	10	223	180	.030	.048	.005	1.00	2.37	174.2	138.5	1.20	1,600	+	—	—	..
Deansboro	Tap, public supply	5/5/10	1	5	312	244	.014	.038	.002	2.40	1.50	200.0	195.0	0.90	1,600	+	+	+	..
Deansboro	Tap, public supply	11/1/10	10	5	285	234	.024	.048	.003	0.60	1.75	228.5	228.0	2.20	500	+	+	—	..
Deansboro	Tap, public supply	12/21/10	Trace	Trace	266	245	.012	.062	.003	1.60	1.25	235.5	225.0	0.70	2,300	+	+	—	..
Delevan	Tap, public supply	5/26/10	Trace	Clear	169	138	.006	.056	.002	0.30	1.25	117.2	117.0	0.75	10	—	—	—	..
Delevan	Tap, public supply	10/13/10	Trace	Clear	145	120	.006	.028	.002	0.30	0.75	120.0	120.0	0.60	800	+	—	—	..
Depew	Tap, public supply	2/14/10	12	15	149	94	.012	.042	.002	0.20	6.25	88.6	88.0	1.90	5,700	—	—	—	..
Depew	Tap, public supply	10/13/10	3	15	151	101	.004	.050	.001	0.02	7.00	90.0	89.0	1.20	50	+	+	—	..

Depew	Tap, public supply	12/16/10	5	20	153	101	.002	.094	.004	0.10	6.25	100.0	99.0	2.00	375	+	+	—	..
Deposit	Tap, public supply	5/20/10	5	5	26	21	.010	.044	.001	.06	.62	10.2	10.0	1.60	85	+	—	—	..
De Ruyter	Tap, public supply	12/28/10	Trace	Clear	51	33	.004	.038	Trace	.30	0.50	18.2	11.0	1.30	90	—	—	—	..
Dolgeville	Tap, public supply	10/20/10	2	5	59	37	.014	.104	.001	0.20	1.00	86.4	35.0	1.00	200	—	—	—	..
Dover Plains	Tap, public supply	1/19/10	2	Clear	40	28	.008	.024	.001	0.20	0.50	24.7	21.0	0.50	120	+	—	—	..
Dover Plains	Tap, public supply	10/25/10	5	2	60	46	.026	.040	.002	Trace	1.50	40.8	39.0	0.70	80	+	+	—	..
Dryden	Tap, public supply	7/19/10	Trace	Clear	185	154	.004	.012	.001	0.80	1.12	140.0	130.0	1.50	100	—	—	—	..
Dryden	Tap, public supply	9/ 9/10	Trace	Clear	174	132	.004	.042	.001	1.60	1.63	122.8	114.0	.20	62,000	+	+	+	..
Dryden	Tap, public supply	11/29/10	Trace	Clear	173	151	.006	.022	Trace	.90	1.25	102.8	....	0.10	25	—	—	—	..
Dunkirk	Tap, public supply	3/22/10	....	....	....	....	....	....	....	....	....	....	....	....	3,200	+	+	+	..
Dunkirk	Tap, public supply	5/24/10	5	15	169	136	.002	.026	.001	0.04	7.00	97.2	85.0	1.20	25	—	—	—	..
Dunkirk	Tap, public supply	10/10/10	5	10	147	98	.006	.104	.002	Trace	6.25	97.1	95.0	1.90	32,500	+	+	—	..
Dunkirk	Tap, public supply	12/14/10	15	60	228	180	.008	.060	.001	0.10	6.25	98.6	93.0	2.90	500	+	+	—	..
Earlville	Tap, public supply	5/ 6/10	10	3	50	39	.042	.048	.001	Trace	0.25	19.5	18.0	1.00	1,000	+	—	—	..
Earlville	Tap, public supply	11/ 2/10	15	20	86	56	.006	.338	.002	0.02	1.50	52.9	52.0	8.00	240	+	+	—	..
Earlville	Tap, public supply	12/21/10	Trace	Clear	59	43	.010	.016	.002	0.32	0.50	37.7	35.0	2.15	1,600	+	+	—	..
East Aurora	Tap, public supply	2/15/10	Trace	Clear	332	268	.006	.010	.010	.20	4.00	221.5	196.0	0.60	300	—	—	....	..
East Aurora	Tap, public supply	5/28/10	Trace	Trace	304	258	.024	.014	.005	Trace	3.25	221.5	208.0	0.95	15	—	—	—	..
East Aurora	Tap, public supply	10/13/10	Trace	1	280	236	.002	.026	.001	Trace	3.00	214.5	200.0	0.80	10	—	—	—	..
East Randolph	Tap, public supply	3/22/10	Trace	Clear	106	84	.016	.012	.001	0.80	1.25	74.3	60.0	0.60	30	—	—	—	..
East Randolph	Tap, public supply	12/14/10	Trace	2	103	87	.006	.014	.001	0.80	1.25	74.3	62.0	0.40	30	+	—	—	..
East Syracuse	Tap, public supply	2/19/10	....	....	....	....	....	....	....	....	....	....	....	....	325	+	—	—	..
East Syracuse	Tap, public supply	4/21/10	....	....	258	216	.006	.208	.002	.50	2.25	182.8	....	4.20	1,600	+	+	—	..
East Syracuse	Tap, public supply	5/26/10	20	5	236	215	.010	.114	.003	.70	2.00	214.5	168.0	5.00	3,040	....	....	....	..
East Syracuse	Tap, public supply	6/28/10	Trace	5	227	196	.002	.010	.002	0.80	1.75	180.0	178.0	1.20	900	+	—	—	..
East Syracuse	Tap, public supply	9/ 9/10	5	12	247	192	.056	.026	Trace	0.40	1.75	187.2	187.0	2.60	7,700	+	+	+	..
East Syracuse	Tap, public supply	11/ 7/10	5	Trace	256	222	.006	.060	Trace	.50	2.00	221.5	182.0	1.20	370	+	+	—	..
East Syracuse	Tap, public supply	12/21/10	Trace	Clear	274	215	.006	.028	.003	1.44	1.00	214.5	212.0	1.10	100	+	—	+	..
East Worcester	Tap, public supply	7/23/10	10	2	58	46	.004	.134	Trace	0.04	0.25	45.7	13.5	4.50	1,300	+	+	—	..
Elizabethtown	Reservoir	9/ 9/10	....	....	....	....	....	....	....	....	....	....	....	....	43,000	+	+	+	..
Ellicottville	Tap, public supply	5/27/10	2	12	72	65	.002	.652	.001	0.10	1.00	36.4	33.0	1.10	17,500	+	+	+	..
Elmira	Raw water, at filter plant	6/ 9/10	5	2	106	87	.012	.062	.003	.18	3.00	64.3	60.0	2.30	325	+	+	+	..
Elmira	Filtered water	6/ 9/10	3	Clear	118	97	.008	.026	.002	.18	3.50	58.6	50.0	.80	73	—	—	—	..
Elmira	Raw water, at filter plant	7/14/10	1	5	160	110	.022	.068	.001	0.20	5.00	81.4	81.0	1.00	800	+	+	—	..
Elmira	Filtered water	7/14/10	Trace	Clear	135	93	.010	.050	.001	0.20	5.25	80.0	74.0	0.60	25	—	—	—	..
Elmira	Raw water, at filter plant	9/14/10	10	8	153	107	.014	.092	.002	0.10	10.25	75.7	72.0	1.70	600	+	+	—	..
Elmira	Filtered water	9/14/10	Trace	1	161	132	.010	.094	.001	0.10	10.25	75.7	70.0	0.70	15	—	—	—	..
Elmira	Raw water, at filter plant	10/29/10	10	3	157	113	.014	.080	.002	.12	7.25	91.4	91.0	0.30	475	+	+	—	..
Elmira	Filtered water	10/29/10	3	Clear	156	131	.010	.060	Trace	.14	9.00	91.4	88.0	.10	3	—	—	—	..
Elmira	Raw water, institution supply	11/ 5/10	15	3	71	50	.012	.148	.002	Trace	2.25	48.6	33.0	4.20	850	+	—	—	..
Elmira	Tap, City water at Elmira Reformatory	11/ 5/10	Trace	Clear	171	144	.004	.038	.002	0.10	1.62	100.0	88.0	0.80	110	—	—	—	..
Elmira	Ice from reservoir of water supply	11/ 5/10	....	....	....	....	....	....	....	....	....	....	....	....	90	+	—	—	..
Elmira	Raw water, at filter plant	12/ 8/10	5	Trace	135	100	.018	.074	.005	.40	5.25	80.0	68.0	1.20	400	+	+	—	..
Elmira	Filtered water	12/ 8/10	Trace	Clear	148	111	.006	.044	.001	0.50	5.25	80.0	64.0	0.90	21	—	—	—	..
Elmira Heights	Tap, public supply	5/10/10	10	Trace	70	55	.016	.052	.010	.50	1.50	28.6	11.0	2.30	120	+	—	—	..
Endicott	Tap, public supply	3/15/10	Trace	Trace	231	210	.008	.004	.005	0.14	13.75	156.0	....	0.81	27	—	—	—	..
Endicott	Tap, public supply	9/ 7/10	Trace	Clear	176	147	.056	.018	.001	Trace	3.50	111.4	....	0.10	32,000	+	—	—	..
Endicott	Tap, public supply	10/ 4/10	Trace	Clear	269	170	.010	.018	.003	.02	24.75	168.6	165.0	0.25	13,000	+	—	—	..

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ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	(B. Coli Type (+=Present) —=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Fayetteville	Tap, public supply	2/15/10	Trace	Trace	533	478	Trace	.006	.001	0.04	2.12	343.0	......	0.75	18	—	—	—	
Fayetteville	Tap, public supply	4/21/10	2	Clear	377	358	.002	.008	.002	1.00	1.50	293.0	......	0.56	18	—	—	—	
Fayetteville	Tap, public supply	5/26/10	2	Clear	362	325	.012	.018	.001	2.00	2.25	271.5	172.0	0.50	43	—	—	—	
Fayetteville	Tap, public supply	12/20/10	5	Clear	610	515	.010	.028	.001	1.20	1.00	428.5	176.0	0.48	8	+	—	—	
Fishkill Landing	Tap, public supply	11/29/10	10	20	42	26	.004	.060	.001	Trace	2.50	19.5	10.0	1.30	9,500	+	+	—	
Fonda	Tap, public supply	1/ 6/10	5	Clear	316	263	.028	.020	.002	0.50	3.00	243.0	196.0	1.15	230	—	—	—	
Fonda	Tap, public supply	4/ 6/10	Trace	Clear	180	153	.054	.024	.001	0.20	1.75	145.8	140.0	1.00	1,500	—	—	—	
Fonda	Tap, public supply	6/30/10	Trace	Trace	155	120	.004	.014	.020	1.00	1.75	111.4	97.0	0.40	600	+	+	......	
Fonda	Stream, one-half mile from whey tub	7/25/10	......	......	......	......	......	......	......	......	......	......	......	......	58,000	+	+	—	
Fonda	Confluence of two springs	7/25/10	Trace	1	260	179	.024	.050	.001	0.20	0.50	180.0	178.0	0.40	13,500	+	+	—	
Fonda	Intake of upper reservoir	7/25/10	......	......	......	......	......	......	......	......	......	......	......	......	86,000	+	+	—	
Fonda	Outlet of upper reservoir	7/25/10	Trace	Trace	266	196	.004	.048	.001	0.10	1.50	201.0	200.0	0.20	2,100	......	......	......	
Fonda	Tap, public supply	11/ 1/10	5	Clear	238	210	.008	.026	.001	0.20	1.00	208.0	204.0	0.70	110	+	—	—	
Fonda	Tap, public supply	12/29/10	Trace	Clear	260	240	.008	.034	.001	0.40	2.50	243.0	240.0	4.50	2,600	+	+	—	
Forestville	Tap, public supply	5/ 6/10	10	20	174	145	.004	.016	.001	0.20	1.50	120.0	104.0	2.30	3,000	+	+	—	
Fort Edward	Tap, public supply	2/ 4/10	1	Clear	36	18	.006	.008	.001	0.40	0.50	14.3	......	1.00	250	—	—	—	
Fort Edward	Tap, public supply	9/13/10	Trace	Clear	32	18	.056	.060	.001	0.12	0.25	16.9	15.0	0.50	23,000	+	+	—	
Fort Edward	Tap, public supply	12/28/10	......	......	......	......	......	......	......	......	......	......	......	......	180	+	—	—	
Fort Plain	Tap, public supply	7/ 1/10	2	Trace	144	125	.004	.032	.001	.20	0.50	117.6	112.0	2.40	600	—	—	—	
Fort Plain	Tap, public supply	12/30/10	10	Trace	127	97	.004	.016	.002	0.20	0.875	94.3	93.0	2.00	190	+	—	—	
Frankfort	Tap, public supply	1/ 6/10	Trace	Clear	147	129	.016	.038	.002	0.30	2.00	105.8	95.0	1.00	130	—	—	—	
Frankfort	Tap, public supply	8/30/10	12	3	165	125	.002	.132	.002	0.02	1.75	122.8	123.0	2.50	800	+	—	—	
Frankfort	Tap, public supply	10/26/10	5	3	160	139	.004	.068	.002	Trace	1.75	131.4	125.0	1.50	220	+	+	—	
Frankfort	Tap, public supply	12/23/10	5	Clear	124	104	.008	.058	.002	0.10	0.75	88.6	78.0	1.00	190	+	+	—	
Franklinville	Well is used for public supply	2/16/10	Trace	Clear	180	132	.004	.004	......	Trace	3.25	91.4	91.0	0.30	130	—	—	—	
Franklinville	Drilled and cased well, public supply	2/16/10	......	......	......	......	......	......	......	......	......	......	......	......	140	—	—	—	
Franklinville	Well at Empire plant	8/15/10	5	Trace	152	107	.002	.028	.001	2.40	4.00	80.0	79.0	0.05	2,350	—	—	—	
Fredonia	Tap, public supply	3/23/10	5	25	104	76	.036	.168	.001	0.30	2.00	40.3	23.0	4.60	8,600	+	+	—	
Fredonia	Tap, public supply	5/24/10	15	80	113	83	.014	.104	.001	0.10	1.25	81.4	78.0	5.00	210	+	+	—	
Fredonia	Tap, public supply	10/10/10	15	15	134	81	.034	.134	.002	0.20	1.75	70.0	69.0	5.20	25,000	+	+	+	
Fredonia	Tap, public supply	12/14/10	35	15	109	83	.012	.060	.001	0.20	1.50	40.3	40.0	3.00	275	+	+	—	
Friendship	Public supply from springs	3/19/10	......	......	......	......	......	......	......	......	......	......	......	......	150	—	—	—	
Friendship	Public supply, driven well	3/19/10	3	Clear	264	240	.008	.022	.001	Trace	26.12	201.4	186.0	1.10	110	—	—	—	

Friendship	Tap, public supply	10/ 8/10	5	Clear	272	246	.006	.016	Trace	0.08	26.00	120.0	188.0	0.60	80	−	−	−
Friendship	Tap, public supply	12/13/10	Trace	Clear	279	227	.020	.072	.001	Trace	23.00	208.0	201.0	0.20	30	−	+	−
Fulton	Wells	1/ 9/10	30	1	170	105	.074	.124	.001	0.60	1.62	90.0	82.0	6.00	19,000	−	−	−
Fulton	Tap, public supply	1/18/10	Trace	Clear	360	277	Trace	.006	.001	0.04	108.00	168.6	.....	0.31	35	−	−	−
Fulton	Tap, public supply	4/21/10	2	Clear	405	305	.002	.002	.001	0.30	126.00	211.5	.....	1.10	55	−	−	−
Fulton	Keeler spring No. 4	5/ 2/10	None	Clear	65	44	.014	.018	.003	1.00	2.50	88.6	77.0	0.10	230	+	−	−
Fulton	Tap, public supply	5/ 2/10	2	Clear	425	265	.004	.042	.001	1.00	116.00	145.8	100.0	0.20	140	+	−	−
Fulton	Tap, public supply	5/26/10	3	Clear	417	294	.008	.024	.001	0.70	120.00	208.0	98.0	1.70	75	+	+	−
Fulton	Spring No. 3	6/27/10	Trace	Clear	125	90	.006	.006	.001	0.80	2.50	88.6	84.0	0.20	20	−	−	−
Fulton	Spring No. 4	6/27/10	Trace	Clear	115	86	.004	.006	.001	1.20	3.00	81.4	78.0	0.20	20	−	−	−
Fulton	Tap, public supply	6/28/10	Trace	Clear	409	298	.010	.012	.002	0.60	72.00	134.2	106.0	1.20	25	−	−	−
Fulton	Spring No. 3	9/20/10	Trace	Clear	143	86	.008	.016	.001	1.60	3.75	85.8	82.0	0.14	10	+	−	−
Fulton	Spring No. 4	9/20/10	Trace	Trace	128	80	.006	.044	.001	1.92	2.50	78.6	75.0	0.19	10	−	−	−
Fulton	Tap, public supply	9/20/10	Trace	Clear	539	359	.014	.036	.001	0.24	144.50	140.0	93.0	0.57	10	+	−	−
Fulton	Spring No. 3	11/15/10	Trace	Trace	132	94	.004	.038	.004	1.44	4.00	93.6	93.0	0.40	44,500	−	−	−
Fulton	Spring No. 4	11/15/10	Trace	Trace	125	84	.008	.060	.003	1.60	3.00	82.2	80.0	0.60	250	−	−	−
Fulton	Tap, public supply	11/16/10	Trace	5	406	296	.004	.022	.012	1.50	109.00	134.2	108.0	0.70	1,400	+	−	−
Fulton	Tap, public supply	12/28/10	5	Clear	443	343	.004	.022	.003	0.40	130.00	293.0	100.0	1.10	375	−	−	−
Geneva	Tap, public supply	1/10/10	Trace	Trace	266	242	Trace	.034	.001	0.08	49.00	180.0	.....	1.16	.....	.....	.....	.....
Geneva	Tap, public supply	2/ 9/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,500	−	−	−
Geneva	Tap at pumping station	2/ 9/10	2	Trace	255	237	.002	.056	.002	Trace	55.00	105.8	.....	1.57	45,500	−	−	−
Geneva	Tap, public supply	4/14/10	1	Trace	238	210	.006	.072	.001	0.26	53.00	92.9	85.0	1.80	.....	−	−	−
Geneva	Tap, public supply	6/27/10	Trace	Trace	227	149	.006	.038	.002	0.40	52.00	122.8	97.0	0.75	4,000	+	−	−
Geneva	Tap, public supply	7/ 6/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	+	−	−
Geneva	Well No. 1, public supply	8/16/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51,000	+	+	+
Geneva	Well No. 2, public supply	8/16/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22,500	+	+	+
Geneva	Tap, public supply	10/22/10	Trace	Trace	231	195	.010	.076	.001	0.20	54.00	100.0	97.0	0.20	60	+	+	−
Geneva	Tap, public supply	12/19/10	Trace	Trace	230	207	.004	.050	Trace	0.20	54.00	105.8	93.0	1.00	550	+	+	−
Geneseo	Tap, public supply	2/12/10	2	Clear	179	137	.024	.124	.003	0.50	14.50	115.8	102.0	1.00	130	−	−	−
Geneseo	Tap, public supply	5/30/10	Trace	Clear	213	136	.014	.118	.002	Trace	13.50	114.2	105.0	0.30	26,000	−	−	−
Glens Falls	Tap, public supply	2/ 3/10	50	Trace	52	26	.012	.072	.002	0.30	0.62	16.2	13.0	6.10	600	+	−	−
Glens Falls	Keenan intake	5/14/10	3	3	35	27	.010	.016	.004	Trace	0.75	26.0	10.0	1.20	350	−	−	−
Glens Falls	Butler intake	5/14/10	15	5	42	31	.012	.086	.004	Trace	0.75	26.0	17.0	4.20	350	+	−	−
Glens Falls	Tap, public supply	5/14/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	140	+	−	−
Glens Falls	Wilkie intake	5/14/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	170	+	−	−
Glens Falls	Tap, public supply	9/13/10	35	10	40	19	.048	.108	Trace	0.02	0.25	18.2	14.0	2.75	200	+	+	−
Glens Falls	Tap, public supply	12/28/10	20	5	53	17	.032	.090	.001	0.20	0.25	15.6	11.0	4.80	1,700	+	+	+
Gloversville	Kingsboro system	1/ 5/10	5	Clear	150	121	.026	.024	.001	0.70	3.75	98.6	97.0	0.50	70	+	−	−
Gloversville	Municipal supply	1/ 5/10	15	Clear	50	33	.038	.046	.001	0.10	1.25	27.3	18.0	2.50	190	+	−	−
Gloversville	Municipal supply	6/28/10	5	Trace	48	31	.006	.062	.001	0.04	0.50	27.3	19.0	3.00	1,100	−	−	−
Gloversville	Kingsboro supply	6/30/10	2	Trace	130	112	.024	.032	.002	0.40	3.25	100.7	94.0	2.30	180	−	−	−
Gloversville	Kingsboro supply	9/ 7/10	Trace	Trace	145	93	.014	.040	.001	0.50	3.37	91.4	.....	0.20	1,100	+	+	+
Gloversville	Municipal supply	9/ 7/10	5	3	55	28	.012	.076	.001	0.04	0.50	27.3	26.0	3.70	6,400	+	+	−
Gloversville	Kingsboro supply	11/ 2/10	5	3	132	104	.004	.130	.002	0.60	3.50	102.8	102.0	0.20	100	+	−	−
Gloversville	Municipal supply	11/ 2/10	12	3	51	33	.016	.102	.002	0.04	1.25	31.2	26.0	4.50	80	+	+	−
Gloversville	Kingsboro supply	12/29/10	Trace	Trace	145	108	.050	.046	.002	0.50	2.50	105.8	103.0	0.80	275	+	−	−
Gloversville	Municipal supply	12/29/10	3	Trace	60	32	.054	.086	.002	0.30	0.50	26.0	24.0	3.90	550	+	+	−
Goshen	Tap, public supply	7/ 6/10	15	10	46	30	.040	.230	.005	0.10	0.75	23.4	16.0	3.40	20,000	−	−	−

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Goshen	Tap, public supply	10/22/10	20	10	78	60	.014	.256	.001	0.04	1.75	27.3	27.0	6.20	19,000	+	+	—	..
Gouverneur	Tap, public supply	2/28/10	55	5	70	40	.066	.192	.003	0.30	0.50	24.7	12.0	17.60	20,000	+	+	—	..
Gouverneur	Tap, public supply	11/14/10	90	10	25	20	.006	.176	.001	0.02	0.50	18.2	17.0	15.50	4,600	+	+	—	..
Gowanda	Tap, public supply	5/26/10	8	40	173	142	.006	.028	.001	1.20	3.00	128.6	113.0	2.40	10,550	+	+	....	..
Gowanda	Tap, public supply	7/8/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,000	+	+	—	..
Granville	Tap, public supply	12/15/10	5	5	95	84	.026	.014	.002	0.50	2.00	84.3	83.0	1.50	375	+	+	—	..
Greece	Raw water, Rochester and Lake Ontario Water Co.	3/15/10	1	50	130	98	.016	.032	.002	0.10	5.75	95.7	95.0	1.00	7,600	+	—	—	..
Greece	Filtered water, Rochester and Lake Ontario Water Co.	3/15/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	78.0	.....	130	—	—	....	..
Greece	Raw water, Rochester and Lake Ontario Water Co.	6/24/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88.5	.....	680	—	—	—	..
Greece	Filtered water, Rochester and Lake Ontario Water Co.	6/24/10	Trace	Trace	154	108	.014	.092	.003	0.04	7.75	92.9	81.0	1.00	85	—	—	—	..
Greece	Raw water, Rochester and Lake Ontario Water Co.	9/19/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89.0	.....	325	+	+	—	..
Greece	Filtered water, Rochester and Lake Ontario Water Co.	9/19/10	2	10	149	109	.010	.132	.002	Trace	7.50	90.0	89.0	1.32	50	—	—	—	..
Greece	Raw water, Rochester and Lake Ontario Water Co.	12/17/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	108.0	.....	.....	1,100	+	+	+	..
Greece	Filtered water, Rochester and Lake Ontario Water Co.	12/17/10	Trace	Clear	135	95	.012	.102	.001	0.10	6.75	94.3	94.0	0.80	90	—	—	—	..
Greene	Tap, public supply	7/21/10	Trace	Trace	150	123	.008	.018	.003	0.60	2.12	120.6	111.0	0.10	1,600	—	—	—	..
Greene	Tap, public supply	10/29/10	Trace	2	153	127	.002	.036	.003	0.60	2.50	122.8	121.0	0.30	20	+	—	—	..
Green Island	Raw water	2/23/10	30	6	251	204	4.500	.110	.005	0.30	18.75	160.0	154.0	4.80	35	—	—	—	..
Green Island	East filter	2/23/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17	—	—	—	..
Green Island	West filter	2/23/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	....	....	....	..
Green Island	Filtered water; mixed effluents of east and west filters	2/23/10	10	Trace	.....	.....	4.500	.110	.005	0.30	20.0	157.2	151.0	2.70	.....	....	....	....	..
Green Island	Raw water; tap on force main	3/10/10	5	Trace	230	188	4.50	.112	.001	0.40	17.25	162.8	153.5	3.00	3,700	+	—	—	..
Green Island	Filtered water; tap on east filter	3/10/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	—	—	—	..
Green Island	Filtered water; tap on west filter	3/10/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32	—	—	—	..

Green Island	Filtered water; mixed effluents of east and west filters	3/10/10	1	Clear	...	...	3.60	.002	.001	0.40	17.12	162.8	151.0	1.80	40	—	—	—
Green Island	Raw water	6/17/10	12	10	230	178	4.50	.080	.003	0.40	17.25	160.0	153.0	3.40	10	—	—	—
Green Island	Effluent of west filter	6/17/10	...	...	...	...	...	...	...	...	...	...	...	...	10	—	—	—
Green Island	Effluents of all filters in operation	6/17/10	5	Trace	234	175	4.50	.100	.010	0.40	16.75	158.6	151.0	2.30	90	+	—	—
Green Island	Tap, public supply	8/25/10	Trace	1	339	278	5.10	.160	.005	0.60	19.75	142.8	141.0	3.80	150	+	+	+
Green Island	Raw water	10/19/10	20	5	352	174	6.00	.260	.011	0.30	18.75	157.2	151.0	6.20	20	+	—	—
Green Island	Effluent of filters	10/19/10	15	2	273	206	6.00	.130	.008	0.30	18.75	157.2	155.0	5.00				
Green Island	Raw water	11/23/10	20	8	189	172	4.20	.070	.012	0.40	17.25	157.2	143.0	4.20	500	+	+	—
Green Island	Filtered water	11/23/10	5	Clear	232	183	3.60	.070	.010	0.40	17.50	157.2	138.0	1.70	60	+	—	—
Green Island	Raw water	12/28/10	20	5	248	188	4.50	.220	.005	0.40	18.00	160.0	151.5	5.60	160	+	—	—
Green Island	Filtered water	12/28/10	20	5	245	171	4.20	.160	.003	0.40	18.50	156.2	148.0	4.30	60	+	—	—
Greenwich	Tap, public supply	2/3/10	47	Trace	135	99	.016	.060	.002	0.30	1.50	68.6	......	5.90	550	+	—	—
Greenwich	Tap, public supply	9/13/10	20	13	124	118	.010	.110	.001	0.04	1.25	114.2	112.0	2.20	200	+	+	—
Greenwich	Tap, public supply	12/1/10	15	Clear	164	114	.012	.050	.001	0.16	2.06	114.2	112.0	2.80	300	...	...	...
Groton	Tap, public supply	5/31/10	10	8	174	136	.008	.192	.002	0.40	0.75	111.4	108.0	7.20	......	+	+	—
Groton	Tap, public supply	7/19/10	5	5	168	130	.004	.028	.001	0.40	1.00	111.4	104.0	1.50	15,000	+	—	—
Groton	Tap, public supply	9/9/10	5	1	180	136	.018	.120	.008	0.20	.875	122.8	121.0	2.30	4,100	+	+	+
Groton	Tap, public supply	10/22/10	3	Trace	179	165	.016	.050	Trace	0.50	1.25	128.6	126.0	0.50	10	—	—	+
Hamburg	Well No. 1; public supply	3/24/10	1	Clear	259	192	.022	.026	.001	3.20	9.00	142.8	120.0	0.70	350	—	—	—
Hamburg	Well No. 1; public supply	6/23/10	Trace	Clear	302	216	.002	.042	.002	1.20	10.25	177.2	160.0	0.70	2,300	—	—	—
Hamburg	Pump station No. 1	10/10/10	Trace	Trace	341	259	.016	.018	.003	1.60	12.25	228.5	181.0	0.20	10	+	—	—
Hamburg	Pump station No. 2	10/10/10	5	12	336	273	.284	.064	.001	Trace	12.25	271.5	269.0	0.40	60	+	+	—
Hamburg	Tap, public supply	12/15/10	Trace	Trace	361	278	.006	.052	.002	0.80	19.50	221.5	169.0	0.60	12	+	—	—
Hamilton	Tap, public supply	1/26/10	Trace	Clear	220	150	.004	.024	.003	0.30	1.75	140.0	121.0	1.00	150	—	—	—
Hamilton	Tap, public supply	5/5/10	Trace	Clear	219	166	.008	.060	.003	0.40	1.50	148.6	125.0	0.75	350	+	—	—
Hamilton	Tap, public supply	11/1/10	Trace	Clear	209	164	.008	.026	.002	0.20	2.13	160.0	157.0	1.10	80	—	—	—
Hamilton	Tap, public supply	12/22/10	...	...	...	...	...	...	...	...	...	...	...	...	10	—	—	—
Hammondsport	Tap, public supply	2/28/10	5	10	160	136	.002	.082	.003	0.66	2.30	105.8	.....	2.30	3,400	—	—	—
Hammondsport	Tap, public supply	6/9/10	5	Clear	164	133	.004	.042	.001	0.50	2.13	120.0	.....	1.10	105	—	—	—
Hammondsport	Tap, public supply	7/16/10	5	1	170	129	.004	.080	.001	0.36	2.25	105.8	102.5	1.30	50,000	+	+	+
Hammondsport	Keuka lake water	8/22/10	Trace	1	111	106	.010	.160	.002	0.12	2.75	75.7	70.0	2.20	600	—	—	—
Hammondsport	Stream above reservoir	8/22/10	10	5	227	201	.002	.016	.001	0.64	2.25	180.0	166.0	1.50	73,000	+	+	+
Hammondsport	Tap, public supply	9/17/10	Trace	Trace	110	89	.012	.072	.001	1.60	2.75	70.0	70.0	1.16	100	+	—	—
Hammondsport	Tap, public supply	9/20/10	12	5	770	529	.008	.126	.001	1.10	193.00	235.5	93.0	3.10	200	+	—	—
Harrison	New York Interurban Water Co.	10/21/10	25	14	97	45	.012	.272	.001	Trace	6.25	44.3	44.0	5.60	7,900	+	+	+
Hartwick	Tap, public supply	1/15/10	...	...	...	...	...	...	...	...	...	...	...	...	120	—	—	—
Hartwick	Power-house pond	1/15/10	...	...	...	...	...	...	...	...	...	...	...	...	5,000	+	—	—
Hastings-on-Hudson	Proposed from New York city at Aqueduct on Sleepy Hollow road	9/21/10	...	...	...	...	...	...	...	...	...	...	...	...	110	+	+	+
Hastings-on-Hudson	Tap, public supply	9/21/10	Trace	Trace	52	46	.010	.066	.001	0.06	4.75	40.3	19.0	0.77	140	+	+	—
Hastings-on-Hudson	Tap on pump, Ardsley (Croton water)	10/12/10	15	30	68	35	.064	.270	.010	0.04	2.25	33.8	33.0	1.50	8,600	+	+	+
Haverstraw	Tap, public supply	2/10/10	5	Clear	84	56	.002	.002	.....	0.10	2.00	50.0	.....	2.30	550	—	—	—
Haverstraw	Tap, public supply	7/8/10	1	5	62	40	.012	.044	.001	0.20	2.00	32.5	30.00	2.10	4,500	+	—	—
Haverstraw	Tap, public supply	11/11/10	2	1	71	41	.010	.044	.002	0.20	3.75	35.1	32.0	1.20	750	+	+	+
Herkimer	Tap, public supply	1/5/10	12	Clear	176	157	.032	.040	.001	0.10	2.25	92.9	88.0	.....	70	—	—	—
Herkimer	Fountain in front of free library	4/6/10	3	Clear	180	145	.016	.030	Trace	1.00	1.87	120.0	120.0	3.00	10	—	—	—
Herkimer	Fountain in front of free library	6/21/10	Trace	Clear	217	165	.004	.016	.001	0.60	3.13	148.6	131.0	3.20	2,000	—	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Herkimer	Fountain in front of free library	8/30/10	10	Clear	189	140	.004	.060	.001	0.40	1.50	134.2	134.0	5.60	1,500	+	—	....	..
Herkimer	Tap, public supply	10/26/10	8	Trace	185	146	.006	.028	.002	0.40	1.75	140.0	138.0	4.60	30	+	—	—	..
Herkimer	Tap, public supply	12/23/10	Trace	Clear	194	139	.006	.068	.001	0.30	1.75	134.2	132.0	6.00	30	+	—	—	..
Highland	Tap, public supply	2/ 9/10	Trace	Clear	69	53	.012	.014	.003	0.04	1.50	32.5	32.0	1.30	130	—	—	—	..
Highland Falls	Tap, public supply	2/ 9/10	10	1	65	51	.008	.022	.002	0.20	2.50	14.3	8.00	2.00	375	+	—	—	..
Highland Falls	Tap, public supply	7/11/10	3	Trace	37	25	.004	.032	.001	0.20	2.00	12.7	12.0	2.00	3,100	+	—	—	..
Hillburn	Tap, public supply	7/ 8/10	15	Trace	51	30	.078	.100	.001	0.10	3.12	15.6	11.0	4.20	4,000	—	—	—	..
Hillburn	Tap, public supply (dug wells)	10/22/10	5	10	95	69	.004	.016	.002	0.24	4.50	35.1	33.0	0.30	200	—	—	—	..
Hobart	Tap, Town brook, source	2/18/10	5	10	30	18	.022	.048	.002	0.60	1.00	9.5	6.5	1.70	5,600	+	+	+	..
Hobart	Grant stream, just below old reservoir, old supply	2/18/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,200	+	+	+	..
Hobart	Tap in Dr. Hubbell's residence, public supply	2/18/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,000	+	+	+	..
Hobart	Reservoir	2/15/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	250	+	—	—	..
Hobart	Faucet	2/15/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	+	—	—	..
Hobart	Tap in livery	6/ 4/10	Trace	Clear	47	27	.002	.080	.002	0.10	0.75	22.1	20.0	0.50	650	+	+	+	..
Hobart	Tap, Shackleton	6/ 4/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	275	+	—	—	..
Holland	Tap, public supply	5/27/10	Trace	Clear	171	121	.004	.044	.005	4.00	7.50	120.0	100.0	0.60	4,000	+	—	—	..
Holland	Tap, public supply	10/13/10	1	12	305	230	.370	.236	.001	Trace	39.50	208.0	190.0	0.40	1,000	+	+	—	..
Holley	Tap, public supply	2/16/10	1	Clear	250	211	.006	.008	.002	Trace	2.50	165.8	165.0	1.00	200	—	—	....	..
Holley	Tap, public supply	6/24/10	Trace	Clear	286	200	.034	.024	.002	0.02	2.50	177.2	173.0	0.50	4,600	—	—	—	..
Holley	Tap, public supply	10/14/10	Trace	Clear	271	240	.006	.024	.001	0.40	3.00	188.5	186.0	0.30	30	+	—	—	..
Holley	Tap, public supply	12/19/10	10	Trace	322	229	.002	.004	.001	0.40	6.75	228.5	218.0	2.25	6,100	—	—	—	..
Homer	Tap, public supply	5/13/10	None	Clear	145	130	.008	.012	.001	0.40	0.75	117.2	117.0	0.35	16	—	—	—	..
Homer	Tap, public supply	5/31/10	None	Clear	141	126	.008	.012	.002	0.60	1.00	117.2	117.0	0.50	8	—	—	—	..
Homer	Tap, public supply	7/19/10	Trace	Trace	150	118	.014	.020	.001	0.40	1.75	101.5	100.0	0.30	10	—	—	—	..
Homer	Tap, public supply	9/ 7/10	Trace	Clear	168	112	.008	.016	.001	0.20	1.00	108.6	105.0	0.10	10	—	—	—	..
Homer	Tap, public supply	11/18/10	5	Clear	151	135	.018	.024	Trace	0.24	1.50	134.2	130.0	0.10	5	—	—	—	..
Homer	Tap, public supply	12/15/10	Trace	Trace	153	130	.004	.010	Trace	0.20	1.75	122.8	110.0	0.30	8	—	—	—	..
Hoosick Falls	Tap, public supply	12/16/10	Trace	Clear	133	106	.006	.056	.002	0.50	4.50	101.5	97.0	1.20	8	—	—	—	..
Hornell	Tap, public supply	2/15/10	7	Trace	165	148	.002	.032	.002	0.04	2.75	72.8	.....	1.83	300	+	—	—	..
Hornell	Tap, public supply	7/16/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,000	+	—	—	..
Hornell	Tap, public supply	7/20/10	5	1	150	113	.006	.068	.001	0.30	1.25	80.0	.....	2.40	7,200	+	—	—	..

Hornell	Tap, public supply	9/15/10	5	Trace	143	108	.012	.058	.001	0.36	1.50	105.8	105.0	1.95	180	+	+	+
Hornell	Tap, public supply	12/6/10	Trace	Trace	139	121	.008	.050	.001	0.50	2.75	92.9	90.0	1.00	600	+	−	−
Horseheads	Tap, public supply	3/1/10	2	1	174	148	.002	.012	.003	0.04	5.50	123.8	....	0.76	33	−	−	−
Horseheads	Tap, public supply	5/10/10	5	Clear	169	149	.004	.040	.005	0.60	4.25	114.2	....	2.00	90	−	−	−
Horseheads	Tap, public supply	6/9/10	5	Trace	185	152	.010	.018	.003	0.70	4.50	120.0	118.0	0.60	60	−	−	−
Horseheads	Tap, public supply	7/14/10	Trace	Clear	171	136	.018	.018	.001	0.40	5.00	122.8	116.0	0.50	100	−	−	−
Horseheads	Tap, public supply	9/15/10	10	5	204	130	.008	.064	.003	0.72	5.75	128.6	123.0	0.20	3,600	+	−	−
Horseheads	Tap, public supply	10/29/10	....	....	....	....	....	....	....	....	....	....	....	....	950	+	−	−
Horseheads	Tap, public supply	12/8/10	Trace	Trace	190	151	.004	.100	Trace	0.40	6.75	134.2	117.0	0.10	170	−	−	−
Hudson	Tap, public supply	1/10/10	5	Clear	84	57	.014	.048	.002	0.20	2.00	42.9	40.5	1.80	100	−	−	−
Hudson	Tap in training school	8/12/10	5	Trace	77	58	.012	.080	.001	0.04	1.25	57.1	38.0	1.25	27,500	−	−	−
Hudson	Raw water (municipal filters)	9/2/10	10	5	68	43	.002	.136	.002	0.02	1.50	40.3	38.0	1.30	300	+	+	−
Hudson	Filtered water	9/2/10	Trace	Trace	76	48	.016	.094	.002	0.04	1.12	48.6	47.0	1.30	180	−	−	−
Hudson	Tap, public supply	11/11/10	3	1	74	42	.008	.060	.002	Trace	2.25	41.6	41.0	2.00	170	+	−	−
Hudson Falls	Tap, public supply	9/13/10	15	1	84	73	.002	.068	.001	0.48	1.63	40.3	31.0	3.25	170	+	+	+
Hudson Falls	Tap, public supply	12/28/10	10	Trace	87	54	.026	.026	.002	0.20	4.00	42.9	32.0	2.65	550	+	+	−
Hyde Park	Spring	4/28/10	Trace	Clear	387	286	.006	.010	.001	2.40	33.75	228.5	138.5	0.50	....	....	....	....
Ilion	Tap, public supply	1/6/10	1	Clear	236	203	.028	.084	.002	0.40	1.25	162.8	126.0	1.05	130	−	−	−
Ilion	Tap, public supply	4/7/10	1	1	200	153	.004	.042	Trace	0.50	1.00	120.0	113.0	1.00	250	−	−	−
Ilion	Tap, public supply	6/21/10	2	5	257	227	.014	.042	.004	0.30	0.50	171.4	140.0	1.70	2,300	+	+	−
Ilion	Tap, public supply	8/30/10	Trace	3	225	187	.008	.078	.003	0.10	0.50	156.0	143.0	1.60	350	+	+	−
Ilion	Tap, public supply	10/26/10	2	2	237	194	.004	.054	.002	0.16	1.00	151.4	143.0	1.00	150	+	−	−
Ilion	Tap, public supply	12/23/10	Trace	Clear	232	174	.008	.028	.001	0.40	0.75	148.6	137.0	0.50	150	−	−	−
Industry	Tap, institution supply	12/29/10	10	2	96	69	.014	.082	.002	0.30	1.00	60.0	56.0	1.20	....	....	....	....
Iroquois	Tap, institution supply	12/5/10	3	Trace	256	213	.168	.028	Trace	Trace	15.00	100.0	....	0.10	550	−	−	−
Iroquois	Tap, power house (Spring Water Supply Company)	12/17/10	Trace	Clear	227	196	.008	.012	.002	0.12	0.50	191.4	187.0	0.40	250	−	−	−
Irvington	Tap, public supply	11/30/10	10	3	51	28	.024	.158	.001	Trace	3.50	23.4	12.0	0.90	500	−	−	−
Ithaca	Tap, public supply	2/25/10	Trace	Trace	145	132	.002	.016	.002	0.68	2.00	80.6	....	1.39	120	−	−	−
Jamestown	Tap, public supply	3/23/10	Trace	Clear	123	112	.016	.020	.003	Trace	2.00	92.9	81.0	0.80	190	−	−	−
Jamestown	Tap, public supply	10/10/10	Trace	Trace	124	99	.004	.012	.002	Trace	2.50	98.6	88.0	0.10	2,000	+	−	−
Jamestown	Tap, public supply	11/15/10	....	....	....	....	....	....	....	....	....	....	....	....	50	+	−	−
Johnstown	Tap, public supply	1/5/10	5	Clear	110	90	.034	.032	.002	0.20	1.50	80.0	79.0	1.35	275	+	−	−
Johnstown	Tap, public supply	6/30/10	Trace	Clear	113	105	.004	.012	.005	0.04	0.50	98.6	93.0	1.00	500	−	−	−
Johnstown	Tap, public supply	9/7/10	10	5	115	94	.004	.094	Trace	0.04	0.25	91.4	81.0	2.60	26,000	+	+	+
Johnstown	Tap, public supply	11/2/10	Trace	Clear	92	83	.004	.042	.002	0.10	1.25	81.4	81.0	1.00	60	+	+	−
Johnstown	Little lake	11/9/10	30	Trace	16	1	.040	.046	.001	0.02	0.25	....	....	6.40	....	....	....	....
Johnstown	Tap, public supply	12/29/10	5	Trace	103	75	.084	.130	.002	0.20	0.75	74.3	73.0	1.50	350	+	−	−
Jordan	Tap, public supply	9/23/10	Trace	Trace	876	656	.018	.016	.001	0.96	2.00	500.0	191.0	0.14	130	+	+	−
Jordan	Tap, public supply	11/7/10	Trace	Clear	895	803	.006	.016	Trace	0.50	1.75	457.0	218.0	0.10	9,350	+	−	−
Katonah	Tap, public supply	1/18/10	Trace	Clear	163	136	.012	.004	.001	1.20	5.25	90.0	88.0	2.50	110	−	−	−
Katonah	Tap, public supply	12/1/10	Trace	Clear	182	120	.004	.024	.001	0.80	6.00	120.0	118.0	0.15	150	+	+	−
Kings Park	Tap, pumphouse State hospital supply	9/22/10	Trace	Trace	142	62	.026	.046	.001	2.40	20.00	54.3	23.0	0.38	30	−	−	−
Kingston	Tap, low service, public supply	2/8/10	1	Clear	47	30	.012	.024	.001	0.30	1.50	14.3	4.00	1.60	220	+	−	−
Kingston	Tap, high service, public supply	2/8/10	Trace	Clear	22	14	.006	.006	.001	0.20	1.75	12.7	9.00	1.00	70	−	−	−
Kingston	Raw water	4/21/10	....	....	....	....	....	....	....	....	....	....	....	....	190	+	+	+
Kingston	Reservoir No. 1	4/21/10	....	....	....	....	....	....	....	....	....	....	....	....	1,400	+	+	+
Kingston	Reservoir No. 4	4/21/10	30	5	35	17	.034	.104	.001	0.10	0.75	9.50	6.00	3.80	2,000	+	+	+

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (−=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Kingston	Effluent pipe of filter	4/21/10	9	3	33	15	.156	.128	.001	0.10	0.50	6.3	5.5	2.60	221	+	+	+	..
Kingston	High pressure, filtered	7/5/10	1	Trace	33	18	.004	.076	.001	0.04	0.50	11.1	11.6	1.50	75	−	−	−	..
Kingston	Low pressure, filtered	7/5/10	1	Trace	39	23	.062	.044	.002	0.04	1.25	14.3	13.0	0.90	150	−	−	−	..
Kingston	High pressure, filtered	10/18/10	....	....	....	....	....	....	....	....	....	....	....	....	20	−	−	−	..
Kingston	Low pressure, filtered	10/18/10	15	Trace	45	22	.002	.132	.002	0.10	1.00	22.1	21.0	3.20	60	−	−	−	..
Kingston	High pressure, filtered	12/21/10	Trace	Clear	41	20	.012	.036	.001	0.10	2.25	19.5	17.0	0.50	40	+	−	−	..
Kingston	Low pressure, filtered	12/21/10	8	Clear	40	21	.010	.022	.001	0.10	1.25	19.5	18.0	1.20	20	−	−	−	..
Lackawanna	Tap, public supply	2/16/10	10	10	140	95	.002	.026	.002	0.04	5.75	91.4	90.0	1.80	600	+	−	−	..
Lackawanna	Tap, public supply	4/23/10	1	12	124	92	.008	.042	.001	0.10	5.50	80.0	79.5	1.00	200,000	−	−	−	..
Lackawanna	Tap, public supply	6/22/10	....	....	....	....	....	....	....	....	....	....	....	....	950	−	−	−	..
Lackawanna	Tap, public supply	9/19/10	5	45	167	121	.034	.146	.003	0.02	6.75	97.2	90.0	1.74	10,500	+	+	+	..
Lackawanna	Tap, public supply	10/14/10	Trace	3	130	101	.006	.092	.002	Trace	7.25	100.0	100.0	2.10	400	+	+	+	..
Lacona	Tap, public supply	11/17/10	5	Clear	119	92	.006	.014	.003	0.60	2.25	12.7	9.5	0.30	200	−	−	−	..
Larchmont	Reservoir	7/4/10	20	Trace	71	40	.038	.178	.003	0.04	3.75	35.1	26.0	4.70	4,400	+	+	−	..
Larchmont	Tap, public supply	9/21/10	12	2	78	33	.016	.214	Trace	0.04	4.63	31.2	27.0	3.68	200	+	+	−	..
Larchmont	Tap, public supply	12/1/10	....	....	....	....	....	....	....	....	....	....	....	....	800	+	−	−	..
Le Roy	Tap, public supply	2/12/10	10	1	588	461	.056	.058	.004	0.20	15.50	371.5	264.0	4.00	210	−	−	−	..
Le Roy	Tap, public supply	5/27/10	1	Clear	567	417	.020	.068	.002	0.50	36.00	307.0	148.0	1.10	3,850	+	+	−	..
Le Roy	Well No. 1, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	15	−	−	−	..
Le Roy	Well No. 2, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	30	+	−	−	..
Le Roy	Well No. 3, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	10	−	−	−	..
Le Roy	Well No. 4, public supply	7/18/10	....	....	....	....	....	....	....	....	....	....	....	....	25	−	−	−	..
Lestershire	Tap, public supply	1/7/10	Trace	Trace	271	250	0.00	.010	.002	.100	12.50	214.5	....	0.29	275	−	−	−	..
Lestershire	Tap, public supply	3/8/10	0	Trace	185	156	Trace	.008	.001	2.00	5.00	120.0		0.48	350	−	−	−	..
Lestershire	Tap, public supply	5/16/10	2	Clear	194	163	.006	.008	.001	1.20	5.00	128.6	119.0	0.80	5	−	−	−	..
Lestershire	Tap, public supply	7/13/10	Trace	Clear	220	171	.004	.008	Trace	1.60	6.25	148.6	139.0	1.20	4,700	−	−	−	..
Lestershire	Tap, public supply	9/13/10	Trace	Trace	273	171	.002	.002	.001	2.40	7.75	160.0	153.0	1.10	60	−	−	−	..
Lestershire	Tap, public supply	12/7/10	Trace	Clear	190	166	.006	.012	Trace	1.40	6.50	128.6	125.0	0.10	320	−	−	−	..
Lima	Tap, public supply	6/24/10	Trace	Trace	313	....	.002	.026	.002	Trace	4.00	250.0	....	0.50	750	−	−	−	..
Little Falls	Tap, public supply	1/5/10	5	Clear	134	116	.008	.024	.001	0.30	0.75	102.8	93.5	1.40	350	−	−	−	..
Little Falls	Tap, public supply	4/6/10	....	....	....	....	....	....	....	....	....	....	....	....	450	+	−	−	..
Little Falls	Tap, public supply	8/30/10	30	30	124	83	.002	.110	.002	0.20	0.25	75.70	75.0	6.84	19,000	+	+	−	..
Little Falls	Tap, public supply	11/1/10	30	10	136	118	.012	.092	.001	0.20	1.00	102.8	101.0	2.95	600	+	+	−	..

Little Falls	Tap, public supply	12/30/10	10	3	134	108	014	040	001	0.30	0.80	101.5	98.0	1.80	1,100
Little Valley	Tap, public supply	8/27/10	Clear	Trace	80	61	000	006	005	1.00	1.98	81.4	49.0	1.00	3,800
Livonia	Tap, public supply	9/28/10	Trace	Clear	167	118	008	007	001	Trace	14.80	109.0	97.0	8.00	19,800
Lockport	Tap, untreated water	8/11/10	. . .												400
Lockport	Tap, treated water	8/11/10	. . .												800
Lockport	Pumping station	10/11/10	2	8	138	112	018	109	002	Trace	0.30	97.9	90.0	1.00	600
Lockport	Tap, Lockport pumps	12/17/10	12	30	106	140	018	080	003	0.04	8.00	108.8	103.0	3.70	178
Long Lake	Lake	9/10/10													180
Long Lake	Spring	9/10/10	.												800
Long Lake	Reservoir	9/10/10													9,400
Lowville	Tap, public supply	2/24/10	Trace	Clear	40	26	012	011	Trace	1.00	1.75	12.7	9.0	0.90	40
Lowville	Tap, public supply	11/15/10	Trace	Clear	40	22	004	011	001	1.44	1.00	14.1	11.0	1.90	60
Lyndonville	Millpond, proposed source	6/22/10	10	15	204	187	048	180	007	0.02	20.10	140.0	107.0	4.00	8,000
Lyons	Tap, public supply	1/4/10	13	8	1,407	1,238	100	110	008	0.24	800.0	071.0	[illegible]	1.10	[illegible]
Lyons	Tap, public supply	2/21/10	23	7	1,0[illegible]	021	1[illegible]	1[illegible]	004	0.02	200.0	114.5		1.10	64,000
Lyons	Tap, public supply	4/12/10	25	8.0	1,151	004	018	110	000	0.10	[illegible]	[illegible]	[illegible]	0.10	0300
Lyons	Tap, public supply	5/18/10	3.5	3	1,110	078	010	1[illegible]	002	0.00	[illegible]	[illegible]	[illegible]	3.70	[illegible]
Lyons	Mud creek at intake	6/18/10	30	18	400	140	010	[illegible]	001	0.10	[illegible]	[illegible]	[illegible]	[illegible]	1,[illegible]
Lyons	Tap, public supply	6/18/10	20	10	1,0[illegible]	773	030	11[illegible]	001	0.40	[illegible]	[illegible]	100.0	0.00	[illegible]
Lyons	Mixed well and river water	6/18/10	.												[illegible]
Lyons	River in rear of pumping station	9/21/10	30	8	541	301	00[illegible]	210	000	0.18	10.30	000.0	[illegible]	[illegible]	[illegible]
Lyons	Tap, public supply	9/23/10	20	3	1,218	001	0[illegible]	118	003	0.16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lyons	Mud creek at rear of pumping station	11/[illegible]/10	20	80	380	271	[illegible]	101	004	0.10	[illegible]	[illegible]	[illegible]	[illegible]	18,000
Lyons	Tap, public supply	11/2[illegible]/10	20	40	000	800	[illegible]	100	[illegible]	0.00	[illegible]	[illegible]	100.0	[illegible]	[illegible]
Lyons Falls	Tap, public supply	11/15/10	15	Trace	41	16	00	[illegible]	00[illegible]	[illegible]	[illegible]	14.1	[illegible]	[illegible]	100
Madison	Pump, public supply	5/4/10	Trace	Clear	160	1[illegible]	010	[illegible]	001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,400
Madison	Tap, public supply	11/1/10	Trace	Clear	10[illegible]	140	000	[illegible]	00[illegible]	[illegible]	[illegible]	145.0	[illegible]	[illegible]	[illegible]
Madison	Pump, public supply	12/21/10	Trace	Clear	10[illegible]	111	00[illegible]	[illegible]	001	[illegible]	[illegible]	[illegible]		0.60	[illegible]
Malone	Tap, public supply	2/10/10	Trace	Trace	1[illegible]	100	00[illegible]	010	001	[illegible]	[illegible]	[illegible]	[illegible]	1.00	1,000
Malone	Tap, public supply	11/12/10	Trace	Clear	115	[illegible]	01[illegible]	000	00[illegible]	[illegible]	1.00	[illegible]	100.0	0.40	[illegible]
Manlius	Tap, public supply	1/17/10	4	2	260	[illegible]	Trace	010	001	[illegible]	[illegible]	[illegible]		0.15	14
Manlius	Tap, public supply	4/21/10	2	Clear	2[illegible]	205	00[illegible]	000	001	[illegible]	1.00	[illegible]		0.00	5
Manlius	Tap, public supply	5/20/10	2	Clear	251	224	00[illegible]	01[illegible]	00[illegible]	0.00	[illegible]	[illegible]	210.0	1.90	[illegible]
Marathon	Tap, public supply	3/14/10	Trace	Clear	50	50	00[illegible]	01[illegible]	002	Trace	[illegible]	[illegible]		[illegible]	[illegible]
Marathon	Tap, public supply	7/21/10	1	Trace	60	40	00[illegible]	01[illegible]	001	Trace	[illegible]	10.1	[illegible]	[illegible]	[illegible]
Marathon	Tap, public supply	12/29/10	Trace	Clear	4[illegible]	31	001	01	Trace	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Marcellus	Reservoir at intake	12/14/10	Trace	Clear	303	242	00	054	015	1.44	[illegible]	[illegible]	[illegible]	1.00	[illegible]
Marcellus	[illegible]	12/14/10	. . .												1,000
Matteawan	Matteawan State Hospital, artesian well	5/23/10	5	Trace	258	163	16	[illegible]	040	0.80	15.00	[illegible]	[illegible]	1.00	[illegible]
Matteawan	Tap, public supply	11/29/10	10	20	4[illegible]	26	001	[illegible]	001	Trace	[illegible]	[illegible]	[illegible]	[illegible]	0,000
Mayville	Tap, public supply	3/31/10	Trace	Clear	109	129	00[illegible]	01[illegible]	001	0.00	[illegible]	[illegible]	100.0	0.60	[illegible]
Mayville	Tap, public supply	10/10/10	Trace	Clear	126	109	00[illegible]	0[illegible]	00[illegible]	0.10	[illegible]	[illegible]	[illegible]	[illegible]	1,[illegible]
McGraw	[illegible]	12/15/10	Trace	Clear	173	136	00[illegible]	01[illegible]	00[illegible]	1.00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mechanicville	[illegible]	6/9/10	Trace	Clear	149	1[illegible]	01[illegible]	0[illegible]	00[illegible]	2.00	[illegible]	[illegible]	[illegible]	0.40	[illegible]
Mechanicville	[illegible]	12/3/10	5	Clear	163	107	006	01[illegible]	00[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mechanicville	[illegible]	2/2/10	26	15	167	116	01[illegible]	0[illegible]	0[illegible]	0.70	[illegible]	111.1	[illegible]	[illegible]	1,40[illegible]
Mechanicville	[illegible]	9/14/10	10	Trace	200	15[illegible]	00[illegible]	[illegible]	001	0.01	[illegible]	[illegible]	[illegible]	[illegible]	100
Mechanicville	Tap, public supply	12/2/10	25	25	145	109	076	.110	004	0.10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Medina	Tap, public supply	2/16/10	5	Trace	379	280	.012	.014	.003	Trace	7.50	250.0	192.0	1.00	100	—	—	....	..
Medina	Tap, public supply	6/23/10	Trace	Clear	378	278	.004	.026	.002	1.60	7.13	250.0	200.0	0.50	160	—	—	—	..
Medina	Tap, public supply	10/14/10	Trace	Trace	598	470	.010	.048	.001	0.80	13.00	300.0	185.0	0.40	10	—	—	—	..
Medina	Tap, public supply	12/17/10	Trace	Clear	409	308	.006	.030	.001	2.88	8.75	228.5	207.0	1.75	170	—	—	—	..
Middletown	Raw water (Highland source)	10/21/10	....	....	....	....	....	....	....	....	....	....	....	....	700	+	—	—	..
Middletown	Raw water (low pressure)	10/21/10	....	....	....	....	....	....	....	....	....	....	....	....	2,700	+	+	+	..
Middletown	High pressure service	10/21/10	Trace	Trace	53	39	.218	.108	.001	0.10	1.25	182.0	17.0	1.70	210	+	—	—	..
Middletown	Low pressure service	10/21/10	5	Trace	63	45	.014	.180	.001	0.10	1.75	32.5	22.0	3.80	740	+	+	—	..
Middleport	Drilled well, proposed source of supply	10/27/10	10	20	404	316	.004	.018	.002	0.20	9.25	228.5	224.0	0.60	600	+	+	+	..
Millerton	Tap, public supply	1/17/10	Trace	Clear	166	158	.046	.022	.003	0.20	1.75	131.4	123.0	1.00	450	—	—	—	..
Millerton	Tap, public supply	9/ 7/10	Trace	Clear	180	142	.012	.012	.001	0.40	1.75	140.0	109.0	0.10	6,500	+	+	—	..
Mohawk	Tap, public supply	1/ 5/10	3	2	207	186	.032	.044	.001	0.40	4.00	145.8	127.0	0.30	5	—	—	—	..
Mohawk	Tap, public supply	4/ 6/10	Trace	Clear	200	161	.008	.010	Trace	0.40	3.25	142.8	138.0	0.20	2	—	—	—	..
Mohawk	Tap, public supply	6/21/10	Trace	Clear	229	192	.002	.002	.002	0.40	1.00	160.0	136.0	0.80	250	—	—	—	..
Mohawk	Tap, public supply	8/30/10	Trace	Clear	210	184	.002	.030	.001	0.40	3.50	142.8	133.0	0.10	540	+	—	....	..
Mohawk	Tap, public supply	10/26/10	Trace	Clear	200	155	.004	.012	.002	0.14	3.25	154.2	154.0	0.25	5	—	—	—	..
Mohawk	Tap, public supply	12/22/10	Trace	Clear	220	174	.004	.040	.001	0.20	3.00	157.2	148.0	1.55	6	—	—	—	..
Monroe	Tap, public supply	7/ 8/10	3	Trace	33	18	.004	.136	.001	Trace	0.75	9.5	6.0	2.50	32,000	+	—	—	..
Monticello	Inlet, Lake Kiamesha	8/ 1/10	5	5	36	23	.224	.174	.001	Trace	3.50	22.1	6.0	1.80	300,000	+	+	+	..
Monticello	Pump station	8/ 1/10	....	....	....	....	....	....	....	....	....	....	....	....	35,000	+	+	+	..
Monticello	Lake Kiamesha (near inlet)	9/ 1/10	Trace	1	53	28	.010	.158	.002	0.02	17.75	21.5	5.0	4.11	55,000	—	—	—	..
Monticello	Tap, public supply	9/ 1/10	Trace	1	27	16	.022	.094	.002	0.02	2.25	15.6	5.0	1.76	57,000	+	—	—	..
Monticello	Tap, Lake Kiamesha	10/20/10	5	5	24	14	.004	.096	.002	Trace	2.50	12.70	4.0	1.40	20,000	—	—	—	..
Monticello	Tap, 264 Broadway	10/20/10	....	....	....	....	....	....	....	....	....	....	....	....	13,000	+	—	—	..
Monticello	Tap, 198 Broadway	10/20/10	....	....	....	....	....	....	....	....	....	....	....	....	21,000	+	—	—	..
Montgomery	Tap, public supply	7/ 6/10	Trace	Trace	198	146	.020	.028	.003	0.40	3.75	131.4	117.0	0.50	25,000	—	—	—	..
Montour Falls	Tap, public supply	5/10/10	15	110	131	112	.180	.212	.015	0.30	1.50	64.3	62.0	5.70	....	+	+	—	..
Montour Falls	Tap, public supply	6/ 8/10	8	40	105	97	.038	.132	.003	0.40	2.00	64.3	64.0	2.00	840	—	—	—	..
Montour Falls	Tap, public supply	7/14/10	70	60	152	118	.106	.150	.004	0.40	2.25	117.2	117.0	4.00	2,600	+	+	—	..
Montour Falls	Tap, public supply	10/28/10	8	Trace	242	192	.676	.096	.012	0.18	5.75	157.2	152.0	1.00	450	+	+	+	..
Moravia	Tap, East Main street	3/19/10	....	....	....	....	....	....	....	....	....	....	....	....	130	—	—	—	..
Moravia	Lower spring	3/19/10	....	....	....	....	....	....	....	....	....	....	....	....	75	+	—	—	..
Moravia	Spear Spring	3/19/10	3	Trace	83	64	.002	.024	.003	3.20	2.00	41.60	25.00	0.93	150	+	+	—	..

Moravia	Ingalls spring	3/19/10													230	+	+	—
Moravia	Tap, Church street	3/19/10													85	+	+	—
Moravia	Southeast spring	3/19/10													170	+	+	+
Moravia	East spring	3/19/10													7			
Moravia	Driven well	4/18/10													25	—	—	—
Moravia	Tap, public supply	4/18/10													4,000	—	—	—
Moravia	Tap, public supply	4/18/10													35	—	—	—
Moravia	Tap, public supply	5/6/10	5	Trace	89	64	.008	.034	.007	2.00	1.25	37.7	32.0	.90	40	—	—	—
Moravia	Tap, public supply	5/30/10	5	12	85	57	.038	.116	.003	2.00	2.00	41.6	26.0	3.40		+	+	—
Moravia	Tap, watering trough, Main street	6/2/10													1,000	—	—	—
Moravia	Tap, Church street, public supply	6/2/10													26	—	—	—
Moravia	Driven well	6/2/10													24	+	+	+
Moravia	Sears spring	6/28/10													80,000	+	+	—
Moravia	Ingalls spring	6/28/10													32,000	+	—	—
Moravia	Lower spring, one mile east of village	6/28/10													27,000	+	—	—
Moravia	Tap, Church street	6/28/10													300	+	+	—
Moravia	Fountain in front of engine house, Main street	6/28/10													250	+	+	—
Moravia	Tap on Main street, Public supply	6/28/10													2,600	+	—	—
Moravia	Sears spring	8/22/10													40,000	+	+	+
Moravia	Ingalls spring	8/22/10													49,000	+	+	+
Moravia	Tap on Main street	8/22/10	Trace	Trace	130	118	.002	.024	.003	1.76	3.00	77.1	70.0	1.00	2,500	+	+	—
Moravia	Fountain on Main street, public supply	10/5/10	Trace	Clear	280	219	.012	.038	.001	2.00	3.00	160.0	154.0	0.95	90	+	+	+
Moravia	Tap on pump, well water	10/5/10													50	+	—	—
Moravia	Tap, public supply	10/22/10	3	Trace	243	204	.010	.026	Trace	2.80	7.75	157.2	149.0	0.10	60	+	—	—
Moravia	Well, public supply	10/22/10													10	—	+	—
Morrisville	Dug well, State Agricultural School farm	11/23/10	Trace	Clear	417	287	.004	.016	.003	8.00	12.75	271.5	208.0	0.30	2,500	+	+	—
Morrisville	Spring, State Agricultural School	11/23/10	Trace	Clear	207	177	.006	.026	Trace	0.50	1.50	174.2	174.0	0.30	30	+	—	—
Mount Morris	Tap, public supply	2/14/10	3	Trace	260	184	.040	.040	.006	2.00	5.75	168.6	168.0	1.00	4,300	+	—	—
Mount Morris	Tap, school house	3/19/10	5	1	235	193	.030	.070	.004	3.20	6.00	177.2	157.0	1.30	780	+	+	—
Mount Morris	Tap, public supply, Winter's office	3/19/10	Trace	Clear	238	212	.010	.028	.001	3.20	6.00	180.0	157.0	1.10	130	—	—	—
Mount Morris	Bennett creek, 20 rods from highway	5/10/10	30	15	151	99	.004	.114	.003	0.10	0.75	71.4	70.0	7.50	17,000	+	—	—
Mount Morris	Bennett creek, town of Portage, at Woodside	5/10/10	30	12	202	137	.004	.104	.003	0.10	0.75	97.2	71.0	7.10				
Mount Morris	Cold creek	5/23/10	1	Trace	131	93	.006	.056	.001	Trace	0.75	90.0	84.0	0.50				
Mount Morris	Wild cat gully	5/23/10	5	8	126	79	.026	.032	.001	0.04	1.00	71.4	70.0	0.50				
Mount Morris	Lleylman spring	9/2/10	Trace	40	318	239	.008	.142	.002	.80	5.08	157.2	156.0	.20	66,000	+	+	+
Mount Morris	Tap, public supply	9/19/10	2	2	208	187	.004	.056	.004	1.44	5.75	165.8	163.0	0.86	57,500	+	+	+
Morristown	Tap in Comstock Inn bar	9/1/10													100	+	—	—
Mount Vernon	Raw water from intake	1/13/10													1,400	+	+	—
Mount Vernon	Raw water, Mamaroneck river	1/13/10													11,500	+	+	—
Mount Vernon	Filtered water, Mamaroneck river	1/13/10	5	1	95	69	.042	.044	.002	0.80	7.25	57.8	25.0	1.90	23	—	—	—
Mount Vernon	Pelham tap in pump room	1/13/10	15	Trace	130	95	.024	.086	.002	1.20	7.50	61.4	40.0	2.70	1,200	+	+	—
Mount Vernon	Filtered water, Mamaroneck river	2/11/10	Trace	Clear	92	54	.048	.054	.003	0.60	6.25	39.0	23.0	1.60	50	—	—	—
Mount Vernon	Tap, 619 Locust street	3/16/10													110	—	—	—
Mount Vernon	Tap, 62 East 6th street	3/16/10													40	—	—	—
Mount Vernon	Raw water	3/18/10									5.00				800	+	+	+
Mount Vernon	Mamaroneck filtered water	3/18/10	8	Trace	74	48	.012	.054	.002	0.80	5.00	35.1	14.0	1.50	10	—	—	—

Analytical Results of Samples of Water — (*Continued*)

City, town or village	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Mount Vernon	Tap, filtered water, Interurban Water Co.	3/19/10	1	Clear	127	105	.032	.032	.003	0.80	8.37	88.6	56.0	1.20	20	—	—	—	..
Mount Vernon	Raw water, Mamaroneck river	5/6/10	13	6	90	63	.022	.072	.005	0.30	5.00	31.2	30.0	3.00	800	+	+	+	..
Mount Vernon	Filtered water, Mamaroneck river	5/6/10	1	Trace	93	60	.026	.066	.004	0.40	5.25	33.8	25.0	0.20	200	—	—	—	..
Mount Vernon	Raw water, Pelham filter	5/7/10	...	...	...	...	...	...	...	...	...	...	...	...	300	+	+	—	..
Mount Vernon	Filtered water, Pelham plant	5/7/10	Trace	Trace	112	68	.004	.062	.005	0.60	6.25	60.0	40.0	1.00	950	+	—	—	..
Mount Vernon	Fire hydrant at Mount Vernon	7/5/10	10	Trace	118	74	.006	.090	.010	0.80	5.50	61.4	52.0	2.90	1,600	—	—	—	..
Mount Vernon	Raw water, Pelham plant	7/27/10	...	...	...	...	...	...	...	...	...	...	...	...	300	...	+	—	..
Mount Vernon	Filtered water, Pelham plant	7/27/10	5	Trace	112	69	.010	.072	.003	.30	8.12	58.6	39.0	1.30	250	+	—	—	..
Mount Vernon	Raw water, Mamaroneck river	7/27/10	20	15	92	60	.140	.258	.005	0.02	6.50	57.1	38.0	2.70	5,000	+	—	—	..
Mount Vernon	Filtered water, Mamaroneck river	7/27/10	12	5	93	61	.072	.196	.001	0.02	7.00	52.9	38.0	2.30	19,500	+	—	—	..
Mount Vernon	Tap, public supply	9/15/10	22	5	99	67	.028	.226	.007	0.10	8.25	51.4	39.0	3.50	60	+	—	—	..
Mount Vernon	Tap, public supply	10/6/10	...	...	...	...	...	...	...	...	...	...	...	...	475	+	+	—	..
Mount Vernon	Tap on Ardsley pump, Croton water	11/28/10	15	15	81	49	.124	.146	.005	0.10	3.00	45.7	41.0	2.45	290	+	—	—	..
Mount Vernon	Filter bed at foot of falls, raw water, Pelham filter	11/30/10	...	...	...	...	...	...	...	...	...	...	...	...	1,200	+	—	—	..
Mount Vernon	Filtered water, Pelham filter	11/30/10	10	Trace	151	91	.044	.138	.001	0.80	8.50	84.3	53.0	2.80	375	+	—	—	..
Mount Vernon	Mamaroneck creek at dam	11/30/10	...	...	...	...	...	...	...	...	...	...	...	...	900	+	+	+	..
Mount Vernon	Mamaroneck creek, filtered water	11/30/10	10	Trace	119	69	.032	.156	.003	0.40	7.50	57.1	47.0	1.60	2,300	+	—	—	..
Napanoch	Eastern New York Reformatory	9/29/10	5	50	77	55	.016	.052	.001	.02	2.00	20.8	19.0	1.60	68,000	+	+	+	..
Napanoch	Eastern New York Reformatory	11/12/10	3	Trace	21	10	.004	.056	.001	Trace	1.50	9.50	7.0	2.40	170	+	+	—	..
Nassau	Tap, public supply	3/15/10	Trace	Clear	88	61	.044	.046	.001	Trace	0.75	50.0	42.0	0.50	30	—	—	—	..
Nassau	Tap, public supply	9/2/10	5	5	106	85	.002	.186	.002	.02	.25	71.4	66.0	2.70	800	—	+	—	..
Nassau	Tap, spring sample No. 1	10/10/10	Trace	Trace	45	38	.004	.034	.001	0.10	1.50	33.8	24.0	0.50	100	+	—	—	..
Nassau	Aborn spring, sample No. 2	10/10/10	...	...	...	...	...	...	...	...	...	...	...	...	1,300	+	+	+	..
Nassau	Reservoir, sample No. 3	10/10/10	...	...	...	...	...	...	...	...	...	...	...	...	800	+	+	+	..
Nassau	Tap, public supply	11/11/10	5	2	133	96	.006	.146	.001	0.80	3.50	60.0	52.0	3.10	400	+	+	—	..
Newark	Tap, public supply	1/13/10	4	6	521	441	.050	.030	.003	.06	7.50	371.5	.....	1.48	2,700	—	+	—	..
Newark	Tap, public supply	2/21/10	4	Trace	306	252	.004	.018	.002	.06	4.75	221.5	.....	1.11	500	—	—	—	..
Newark	Tap, public supply	5/18/10	3	Clear	329	281	.002	.010	.002	6.40	5.00	278.5	182.0	1.20	65	—	—	—	..
Newark	East intake	9/23/10	Trace	Clear	366	266	.014	.088	.002	5.12	6.25	250.0	194.0	0.67	28,000	+	—	—	..
Newark	West intake	9/23/10	Trace	Clear	345	228	.004	.054	.001	6.40	5.00	221.5	179.0	0.24	3,800	+	—	—	..
Newark	Drilled well	10/25/10	2	5	318	232	.008	.018	.002	3.20	3.75	194.2	182.0	0.10	30	—	—	—	..

Newark	Tap, public supply	11/22/10	Trace	Clear	348	254	.008	.042	.001	3.20	4.50	201.5	198.0	0.80	375	+	+	—	..
Newark	New York State Custodial Asylum	11/29/10	Trace	Trace	1,226	1,096	.006	.014	Trace	.24	3.25	499.0	201.0	1.20	3	—	—	—	..
Newark Valley	Tap, public supply	7/20/10	3	Clear	95	65	.004	.024	.001	0.30	2.50	64.3	62.0	0.70	5,000	+	—	—	..
Newark valley	Tap, public supply	11/30/10	Trace	Clear	48	35	.006	.060	Trace	.44	1.75	12.7	9.0	2.10	47	+	+	—	..
New Hartford	Tap, public supply	1/25/10	5	Trace	202	168	.006	.044	.002	0.50	2.00	162.8	140.0	1.50	2,000	+	—	—	..
New Hartford	Tap, public supply	4/7/10	1	3	160	123	.026	.048	.001	0.80	1.75	100.0	97.0	1.00	275	+	—	—	..
New Hartford	Tap, public supply	6/21/10	5	Trace	187	142	.010	.018	.001	0.30	1.75	140.0	130.0	2.00	12,500	+	—	—	..
New Hartford	Tap, public supply	8/30/10	2	Trace	187	150	.002	.090	.001	0.02	1.00	140.0	128.0	1.85	700	+	+	—	..
New Hartford	Tap, public supply	10/26/10	3	Trace	200	165	.004	.026	.002	0.06	1.50	162.8	149.0	1.40	40	+	+	—	..
New Hartford	Tap, public supply	12/23/10	Trace	Trace	213	162	.054	.058	.005	1.00	1.00	154.2	146.5	1.80	250	—	—	—	..
New Paltz	Tap, public supply	7/7/10	10	30	113	94	.022	.106	.002	Trace	1.00	71.4	68.0	1.80	2,400	+	—	—	..
New Paltz	Tap, public supply	9/2/10	Trace	Trace	106	76	.006	.024	.002	0.10	1.75	64.3	64.0	0.50	120	+	—	—	..
New Paltz	Artesian well, State Normal School	10/21/10													40	+	—	—	..
New Paltz	Spring, public supply	10/21/10													20	+	—	—	..
New Rochelle	Tap, public supply	1/13/10	10	Trace	76	52	.036	.058	.003	0.20	5.25	24.7	22.0		600	+	—	—	..
New Rochelle	Tap, public supply	10/21/10	6	5	86	30	.004	.170	.002	0.04	9.25	28.6	28.0	3.00	100	+	+	—	..
New Rochelle	Tap, public supply	12/1/10													190	+	+	—	..
Niagara Falls	Raw water from power canal	2/15/10	20	12	152	117	.040	.046	.004	Trace	7.00	101.5	93.0	6.00	18,500	...	...	+	+
Niagara Falls	Filtered water, Tap, effluent No. 1	2/15/10	1								8.50				6,450	...	+	+	..
Niagara Falls	Tap, municipal supply	2/15/10	18	8	143	113	.038	.038	.004	Trace	7.00	100.0	92.0	3.80	19,000	...	...	+	—
Niagara Falls	Tap, municipal supply	6/22/10	5	13	155	107	.004	.088	.005	0.02	7.75	92.9	90.0	2.30	12,500	...	...	+	+
Niagara Falls	Raw water at company's canal	6/22/10	2	5	150	103	.014	.056	.004	0.02	8.50	94.3	88.0	1.90	24,000	...	...	+	+
Niagara Falls	Filtered water at company's plant	6/22/10													18,000	...	...	+	+
Niagara Falls	Raw water from Niagara river	10/11/10	5	12	149	113	.036	.104	.002	Trace	6.50	100.0	99.0	1.60	18,000	...	...	+	+
Niagara Falls	Mixed effluents at company's plant	10/11/10	2	3	148	119	.012	.102	.002	0.10	6.75	98.6	98.0	1.30	20,500	...	+	+	+
Niagara Falls	Raw water, company's supply	12/17/10	5	45	249	191	.090	.146	.003	0.08	7.00	120.0	99.0	2.75	11,000	...	+	+	+
Niagara Falls	Filtered water, company's supply	12/17/10	5	30	200	140	.042	.098	.003	0.04	7.50	111.4	99.0	2.75	2,200	...	+	+	..
Niagara Falls	Tap, public supply	12/17/10	5	35	235	171	.068	.168	.003	0.10	7.50	100.0	99.0	4.10	50	...	—	—	—
North Tonawanda	Tap, public supply	2/15/10	Trace	10	144	122	.026	.092	.005	Trace	6.50	97.2	96.0	0.60	850	...	—	—	..
North Tonawanda	Tap, public supply	6/22/10	5	7	169	115	.018	.100	.002	0.02	8.13	88.6	88.0	2.60	31,500	+	—	—	..
North Tonawanda	Tap, public supply	6/22/10													122,000	+	+	—	..
North Tonawanda	Tap, public supply	6/22/10	3	5	160	105	.014	.056	.002	0.04	7.63	92.9	87.0	2.10	82,000	+	+	—	..
North Tonawanda	Tap, public supply	10/11/10	1	15	174	126	.006	.092	.002	Trace	6.50	100.0	98.0	2.20	950	+	+	+	..
North Tonawanda	Tap, public supply	12/17/10	5	35	149	107	.006	.104	.002	0.04	7.50	102.2	98.0	2.60	700	+	+	—	..
North Tonawanda	Tap, public supply	12/28/10													1,900	+	+	—	..
Norwich	Raw water	1/25/10	7	10	78	48	.014	.068	.003	0.60	1.25	44.3	39.0	3.30	3,200	+	—	—	..
Norwich	Filtered water	1/25/10	5	1	71	44	.012	.044	.003	0.40	1.25	40.3	38.5	2.60	2,900	+	—	—	..
Norwich	Raw water	5/6/10	5	12	47	30	.018	.058	.001	Trace	0.25	19.5	13.0	1.20	850	+	+	+	..
Norwich	Filtered water	5/6/10	5	Trace	56	44	.014	.050	.005	Trace	0.50	26.0	23.0	1.00	1,100	+	—	—	..
Norwich	Raw water	10/5/10	20	5	54	27	.034	.222	.002	.120	0.375	26.6	26.0	2.90	1,200	+	+	—	..
Norwich	Filtered water	10/5/10	Trace	Clear	56	40	.670	.190	.002	.260	0.625	26.0	15.0	1.10	200	+	—	—	..
Norwich	Raw water	12/8/10	5	5	53	29	.022	.108	.001	0.36	2.00	28.6	23.0	3.30	170	+	+	—	..
Norwich	Filtered water	12/8/10	Trace	Clear	53	38	.004	.082	.001	0.36	2.00	31.2	22.0	2.00	90	—	—	—	..
Norwood	Tap, public supply	3/3/10	40	Trace	62	32	.012	.060	Trace	.002	1.00	15.6	13.0	14.00	550	+	+	+	..
Norwood	Tap, public supply	12/15/10	80	10	63	30	.008	.080	.001	0.08	1.00	28.6	17.0	15.10	450	+	+	+	..
Nyack	Raw water from Hackensack river	2/9/10													5,400	+	+	—	..
Nyack	Filtered water	2/9/10	25	1	92	62	.010	.068	.001	0.20	3.50	37.7	29.0	4.40	425	—	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Nyack	Tap, Odell system	2/ 9/10	....	....	....	....	....	....	....	....	....	....	....	....	190	—	—	—	..
Nyack	Municipal spring supply	2/ 9/10	30	1	112	66	.002	.038	.004	0.60	4.25	60.0	54.0	4.60	220	—	—	—	..
Nyack	Raw water, Hackensack river	7/ 9/10	....	....	....	....	....	....	....	....	....	....	....	....	5,700	+	+	—	..
Nyack	Municipal, filtered water	7/ 9/10	Trace	Trace	80	59	.004	.046	.001	0.30	3.50	45.0	45.0	1.90	2,900	+	+	—	..
Nyack	Tap, Odell supply	7/ 9/10	....	....	....	....	....	....	....	....	....	....	....	....	500	—	—	—	..
Nyack	Municipal, spring supply	7/ 9/10	Trace	Clear	100	76	.010	.022	.001	0.40	1.62	71.4	69.0	1.10	2,500	+	—	—	..
Nyack	Raw water	10/21/10	....	....	....	....	....	....	....	....	....	....	....	....	600	+	+	+	..
Nyack	Filtered water	10/21/10	Trace	Clear	87	70	.010	.064	.001	.04	4.00	60.0	58.0	1.40	100	+	—	—	..
Nyack	Tap, Odell supply	10/21/10	Trace	Trace	181	134	.010	.028	.002	1.00	5.00	125.8	120.0	0.20	200	+	+	—	..
Nyack	Municipal, spring supply	10/21/10	....	....	....	....	....	....	....	....	....	....	....	....	90	+	+	—	..
Ogdensburg	Black lake	2/22/10	40	15	98	78	.006	.312	.003	0.60	2.50	50.0	40.0	4.30	1,100	—	—	—	..
Ogdensburg	St. Lawrence river	2/28/10	3	Clear	137	110	.066	.114	.003	0.02	5.00	100.0	94.0	1.10	2,100	—	—	—	..
Ogdensburg	Oswegatchie river	2/28/10	....	....	....	....	....	....	....	....	....	....	....	....	35,500	+	—	—	..
Old Forge	Reservoir	5/ 5/10	70	5	95	75	.014	.088	.001	0.40	0.25	60.0	51.0	10.40	....	....	....	....	..
Old Forge	Tap, public supply	5/ 5/10	....	....	....	....	....	....	....	....	....	....	....	....	30	—	—	—	..
Olean	Tap, public supply	1/15/10	Trace	Trace	240	204	.014	.008	.003	0.60	15.50	157.2	155.0	1.35	80	—	—	—	..
Olean	Tap, public supply	2/18/10	....	....	....	....	....	....	....	....	....	....	....	....	40	—	—	—	..
Olean	Tap, public supply	3/ 7/10	3	5	203	173	.032	.048	.003	0.30	10.75	145.8	140.0	0.20	1,900	+	—	—	..
Olean	Tap, public supply	4/20/10	....	....	....	....	....	....	....	....	....	....	....	....	220	—	—	—	..
Olean	Tap, public supply	6/15/10	....	....	....	....	....	....	....	....	....	....	....	....	....	—	—	—	..
Olean	Tap, public supply	8/ 4/10	....	....	....	....	....	....	....	....	....	....	....	....	3,900	—	—	—	..
Olean	Tap, public supply	11/23/10	Trace	Clear	238	188	.004	.012	.001	0.50	14.25	171.4	163.0	0.40	80	+	—	—	..
Olean	Tap, public supply	12/22/10	....	....	....	....	....	....	....	....	....	....	....	....	12	—	—	—	..
Oneida	Tap, public supply	2/11/10	15	5	1,011	840	.038	.034	.008	0.20	17.25	657.0	175.0	1.90	1,400	+	—	—	..
Oneida	Tap, public supply	5/ 4/10	18	25	740	520	.040	.066	.002	0.40	7.25	511.0	148.0	2.60	650	+	—	—	..
Oneida	Tap, public supply	7/ 1/10	10	1	876	709	.004	.052	.001	Trace	9.50	529.0	146.0	1.40	7,800	—	—	—	..
Oneida	Tap, public supply	9/23/10	12	5	1,153	883	.012	.174	.004	.04	16.25	586.0	136.0	3.97	200	+	+	—	..
Oneida	Tap, public supply	10/27/10	35	15	935	773	.012	.160	.001	Trace	11.25	464.5	163.0	2.95	600	+	—	—	..
Oneida	Tap, public supply	12/22/10	15	10	1,010	845	.050	.118	.003	Trace	16.25	483.0	178.0	3.72	650	+	—	—	..
Oneonta	Raw water	1/27/10	10	3	40	25	.038	.050	.001	0.30	1.00	20.8	8.0	2.30	3,000	+	—	—	..
Oneonta	Effluent of filter, unit No. 6	1/27/10	....	....	....	....	....	....	....	....	....	....	....	....	1,700	+	—	—	..
Oneonta	Effluent of all units in operation	1/27/10	8	Trace	....	....	.036	.044	.001	0.30	1.00	18.2	7.0	1.70	1,800	—	—	—	..
Oneonta	Raw water	4/26/10	3	10	45	25	.002	.060	.001	0.04	1.25	24.7	12.0	2.00	2,400	+	+	+	..

Oneonta	Effluent from unit No. 6	4/26/10													475	+	+	+
Oneonta	Mixed effluents of all filters in operation	4/26/10	3	Trace	40	26	.012	.024	.001	0.16	1.25	12.7	8.00	1.50	400	+	+	−
Oneonta	Raw water	7/22/10	5	8	55	41	.046	.130	.002	Trace	.50	33.8	19.0	1.80	5,300	+	−	−
Oneonta	Effluent of filter unit No. 6	7/22/10													550	+	−	−
Oneonta	Effluents of all filters in operation	7/22/10	1	Trace	49	38	.046	.052	.001	0.20	0.50	29.3	14.5	1.10	1,000	+	−	−
Oneonta	Raw water	10/ 4/10	15	3	43	24	.116	.162	.002	.10	1.00	22.1	13.0	2.50	100	+	+	−
Oneonta	Effluent of all filters	10/ 4/10	Trace	Clear	51	27	.454	.086	.004	.320	1.00	20.8	7.0	1.30	120	−	−	−
Oneonta	Effluent of filters, unit No. 6	10/ 4/10													60	−	−	−
Oneonta	Raw water	12/ 7/10	10	5	44	28	.018	.060	.001	0.16	1.25	20.8	10.0	2.40	200	+	−	−
Oneonta	Effluent filter, unit No. 5														26	−	−	−
Oneonta	Effluent of all filters in operation	12/ 7/10	5	Trace	54	42	1.270	.018	.001	0.16	1.00	27.3	7.0	1.20	50	−	−	−
Onondaga	Tap, public supply	5/ 6/10	5	3	169	123	.060	.064	.020	1.00	1.75	98.6	92.0	1.00	9,800	+	+	+
Ossining	Tap, public supply	8/ 3/10													2,000	−	−	−
Ossining	Tap, public supply	11/29/10	35	10	65	38	.074	.208	.003	0.06	2.75	28.6	21.0	3.40	550	+	+	−
Oswego	Tap, public supply	1/19/10	19	5	354	272	.018	.174	.004	.04	76.00	154.2	......	8.77	5,700	+	+	+
Oswego	Tap, public supply	6/29/10	10	18	466	344	.004	.082	.006	0.10	100.00	200.0	90.0	5.20	22,000	+	+	+
Oswego	Tap, public supply	9/20/10	12	2	858	577	.012	.138	.006	.04	198.00	228.5	102.0	7.36	1,200	+	+	+
Oswego	Tap, public supply	11/16/10	15	100	448	340	.026	.154	.008	.06	106.00	128.6	82.0	5.80	2,100	+	+	+
Oswego	Tap, public supply	12/28/10	20	5	557	435	.144	.090	.003	0.20	133.00	428.5	97.0	4.90	2,900	+	+	+
Otego	Tap, public supply	1/27/10	5	Clear	48	38	.030	.032	.002	1.20	1.50	32.5	31.0	0.30	200	+	−	−
Otego	Tap, public supply	7/21/10	Trace	Trace	70	53	.024	.076	.001	0.50	1.625	44.3	40.0	1.30	12,500	+	+	+
Owego	Tap, public supply	1/27/10	.....	Trace	125	107	.002	.004	.....	.14	6.40	94.2	.002	.10	47	−	−	−
Owego	Tap, public supply	5/16/10	5	Clear	36	21	.006	.074	.002	.06	.75	16.9	7.0	2.20	40	−	−	−
Owego	Tap, public supply	6/ 8/10	5	3	38	29	.010	.062	.002	.06	1.00	18.2	9.0	1.60	66	−	−	−
Owego	Wells, public supply	7/13/10	Trace	Clear	125	106	.002	.006	Trace	0.40	5.75	88.6	86.0	0.70	70	−	−	−
Owego	Wells and filtered, public supply	7/13/10													170	−	−	−
Owego	Filtered water, public supply	7/13/10	Trace	2	55	38	.012	.062	Trace	Trace	0.75	33.8	13.0	1.90	400	−	−	−
Owego	Tap, public supply	9/14/10	Trace	Clear	130	94	.012	.038	.001	0.40	5.75	92.9	92.0	0.20	40	+	+	−
Owego	Tap, Raw water supply	11/30/10	10	17	65	46	.016	.150	.002	.20	1.50	15.6	10.0	2.50	440	+	+	−
Owego	Tap, filtered water	11/30/10	3	Trace	49	36	.008	.046	Trace	.32	1.50	15.6	2.0	2.90	3	−	−	−
Owego	Tap, well water	11/30/10	Trace	Clear	114	102	.010	.042	Trace	.40	4.50	65.7	.....	1.40	31	−	−	−
Owego	Tap, public supply	12/ 8/10	2	Clear	71	58	.014	.056	.001	0.40	1.75	26.0	8.0	0.50	15	−	−	−
Oxford, Relief Corps Home	Chenango river	1/ 6/10	10	Trace	192	109	.082	.070	.004	0.40	2.87	101.5	100.0	1.20	650	+	+	+
Oxford, Relief Corps Home	Proposed pump well	1/ 6/10	2	10	292	254	.004	.098	.002	0.02	2.50	.....	163.0	3.00	2,400	−	−	−
Oxford, Relief Corps Home	Tap, D., L. & W. R. R. tank	1/ 6/10	Trace	Trace	94	69	.004	.044	.002	0.60	1.50	61.4	59.0	0.30	250	+	+	−
Oxford	Tap, public supply	7/21/10	Trace	Clear	85	67	.004	.006	.001	0.60	1.00	57.1	46.5	0.20	50	−	−	−
Oxford	Railroad tank, near W. R. C. Home	12/21/10	Trace	Clear	87	61	.006	.010	.002	0.80	1.00	58.6	54.0	0.87	12	−	−	−
Oxford	Upper reservoir, near W. R. C. Home	12/21/10	Trace	Clear	46	26	.006	.008	.002	0.60	1.25	24.7	22.0	0.68	75	+	+	−
Palmyra	Tap, public supply	1/13/10	13	3	67	929	.006	.088	.003	.04	5.50	714.0	.....	3.11	500	+	−	−
Palmyra	Tap, public supply	5/18/10	5	Clear	339	257	.004	.032	.001	2.40	6.50	235.5	190.0	1.90	85	−	−	−
Palmyra	Tap, public supply	9/22/10	8	Trace	918	711	.012	.094	.001	1.44	5.00	464.5	218.0	3.34	700	+	−	−
Palmyra	Tap, public supply	11/22/10	10	Clear	696	537	.008	.062	Trace	3.20	6.50	328.5	222.0	3.20	55	+	−	−
Palmyra	Brook near lower well	12/17/10	18	Trace	889	733	.022	.198	.003	0.60	4.00	464.5	228.0	4.50	3,100	+	+	−
Palmyra	Well at lower pump station	12/17/10	12	Trace	845	667	.012	.096	.002	2.40	4.50	343.0	236.0	2.80	2,400	+	+	+
Palmyra	Well at upper pump station	12/17/10	Trace	1	380	284	.006	.058	.002	3.20	4.75	235.5	232.0	0.70	70	−	−	−

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Palmyra	McKeenie spring, proposed source	12/17/10	10	10	579	362	.018	.098	.003	15.36	22.50	243.0	231.0	2.70	550	+	—	—	..
Pawling	Tap, public supply	10/25/10	3	2	100	79	.010	.088	.002	Trace	2.00	77.1	75.0	1.50	70	+	—	—	..
Pawling	Tap, public supply	12/2/10	5	Trace	101	90	.012	.126	Trace	Trace	2.00	88.6	88.0	2.10	120	+	—	—	..
Peekskill	Tap, public supply	1/3/10	40	Trace	74	50	.028	.126	.003	0.20	3.00	35.1	30.0	7.00	700	+	—	—	..
Peekskill	Effluent chamber of filter No. 1	1/3/10	....	....	....	....	....	....	....	....	....	....	....	....	140	+	—	—	..
Peekskill	Effluent chamber of filter No. 2	1/3/10	....	....	....	....	....	....	....	....	....	....	....	....	51	—	—	—	..
Peekskill	Effluent chamber of filter No. 3	1/3/10	....	....	....	....	....	....	....	....	....	....	....	....	35	+	—	—	..
Peekskill	Mixed effluents of filters No. 1, 2, and 3	1/3/10	35	Trace	86	65	.028	.118	.002	0.20	3.00	41.6	32.0	5.70	....	....	....	....	..
Peekskill	Raw water	4/28/10	....	....	....	....	....	....	....	....	....	....	....	....	475	+	+	+	..
Peekskill	Tap, public supply	4/28/10	18	1	89	50	.006	.068	.001	0.04	2.50	48.6	31.0	3.20	750	+	—	—	..
Peekskill	Raw water	7/6/10	25	5	71	46	.004	.096	.001	0.04	2.00	36.4	35.0	4.00	280	+	+	—	..
Peekskill	Pure water well	7/6/10	20	Trace	83	57	.002	.092	.001	0.04	2.25	45.7	45.0	.70	20	—	—	—	..
Peekskill	Effluent filter, unit No. 1	7/6/10	....	....	....	....	....	....	....	....	....	....	....	....	15	—	—	....	..
Peekskill	Effluent filter, unit No. 3	7/6/10	....	....	....	....	....	....	....	....	....	....	....	....	24	—	—	....	..
Peekskill	Spring, St. Mary's school	9/6/10	10	20	166	103	.004	.018	.002	1.60	12.75	71.4	48.0	0.30	4,700	+	+	—	..
Peekskill	Tap, public supply	9/26/10	5	Clear	98	62	.018	.054	.001	.08	3.50	60.0	59.0	0.76	6	—	—	—	..
Peekskill	Pure water, well	9/26/10	Trace	Clear	84	62	.012	.060	.001	.08	2.50	61.4	60.0	0.92	8	—	—	—	..
Peekskill	Raw water	11/29/10	20	3	80	54	.012	.118	.002	0.04	3.00	48.6	47.0	1.80	300	+	+	+	..
Peekskill	Tap, public supply	11/29/10	....	....	....	....	....	....	....	....	....	....	....	....	20	+	—	—	..
Peekskill	Pure water well	11/29/10	10	Clear	81	53	.010	.110	.001	0.04	3.00	48.6	47.0	1.70	30	+	—	—	..
Pelham Manor	Tap, public supply	3/9/10	2	Trace	650	450	.018	.018	.001	0.60	200.00	293.0	105.0	0.50	....	....	....	....	..
Pelham Manor	Tap, public supply	5/7/10	Trace	Clear	617	438	.002	.004	.001	1.20	210.00	211.5	111.0	1.00	45	—	—	—	..
Pelham Manor	Tap, public supply	7/27/10	Trace	Trace	493	339	.012	.006	.001	1.20	126.50	174.2	92.0	.05	1,300	—	—	—	..
Phelps	Tap, public supply	1/27/10	17	7	231	194	.002	.096	.004	1.84	2.37	174.2	....	3.00	50,000	....	+	....	..
Phelps	Tap, public supply	4/14/10	1	Trace	257	209	.004	.040	.003	2.80	4.75	188.5	162.0	1.20	200	—	—	—	..
Phelps	Tap, public supply	6/25/10	Trace	Clear	266	188	.004	.058	.004	2.40	2.25	177.2	170.0	1.80	1,600	—	—	—	..
Phelps	Tap, public supply	9/20/10	Trace	Clear	335	215	.012	.028	.002	3.84	2.25	208.0	198.0	0.33	100	+	+	+	..
Phelps	Tap, public supply	12/19/10	Trace	Clear	263	232	.006	.016	.001	2.40	2.75	221.5	191.0	0.30	230	—	—	—	..
Philadelphia	Tap, public supply	2/28/10	Trace	Clear	58	38	.080	.080	.001	Trace	0.25	35.1	32.0	0.70	200	—	—	—	..
Philadelphia	Tap, public supply	11/15/10	8	Clear	53	37	.004	.022	.002	0.02	0.75	35.1	34.0	1.40	300	+	—	—	..
Philmont	Tap, public supply	1/17/10	1	Clear	30	20	.018	.098	.003	Trace	0.60	18.2	12.0	2.80	180	—	—	—	..
Philmont	Tap, public supply	9/7/10	3	Clear	40	26	.006	.100	.002	Trace	1.00	11.1	11.0	1.90	150	—	—	—	..
Philmont	Tap, public supply	12/1/10	10	Clear	34	19	.006	.056	.002	Trace	0.75	16.9	14.0	2.40	70	—	—	—	..

Phoenix	Tap, public supply	1/18/10	12	4	432	349	.124	.114	.004	0.02	111.0	180.0	.....	3.81	17,000	+	+	...
Phoenix	Tap, public supply	4/21/10	1	Trace	298	260	.004	.018	.024	0.30	19.75	257.0	.....	0.92	140	—	—	—
Phoenix	Tap, public supply	5/26/10	15	20	343	274	.008	.118	.002	0.20	62.75	148.6	98.0	4.30	100	+	+	—
Phoenix	Tap, public supply	6/29/10	12	25	520	369	.016	.088	.002	0.10	113.00	191.4	93.0	3.00	2,200	+	—	—
Phoenix	Tap, public supply	9/21/10	12	5	770	529	.008	.126	.001	0.10	193.00	235.5	93.0	3.10	200	+	—	—
Phoenix	Tap, public supply	11/15/10	15	100	401	321	.014	.128	.001	0.14	83.0	234.0	79.0	3.00	7,400	+	+	—
Phoenix	Tap, public supply	12/28/10	15	10	584	495	.018	.060	.002	0.80	138.0	335.5	104.0	4.90	29,500	+	—	+
Piercefield	Racquette river	4/28/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	750	+	+	+
Piercefield	Fore bay, near paper mill	4/28/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	+	+	+
Piercefield	Tap at International Hotel	4/28/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	+	—	—
Pike	Miller spring	3/ 3/10	1	Clear	112	70	.002	.020	.001	0.80	2.25	72.9	72.0	0.20	275	—	—	—
Pike	Lyon spring	2/ 3/10	Trace	Clear	115	89	.018	.018	.003	1.20	2.75	67.1	70.0	0.60	190	—	—	—
Plattsburg	Proposed supply	2/22/10	Trace	Trace	145	130	.010	.012	.001	0.30	1.25	128.6	127.0	0.80	.....	.....	.....	.....
Plattsburg	Meade brook (proposed for city use)	3/24/10	30	160	100	56	.002	.196	.001	0.30	0.50	41.6	39.0	6.50	1,000	+	+	—
Plattsburg	Tap, public supply	9/24/10	5	2	136	112	.018	.100	.001	0.08	1.00	110.5	110.0	2.07	700	+	—	—
Pleasantville	Raw water	1/18/10	10	10	90	74	.080	.056	.002	0.20	2.75	51.4	40.0	2.50	1,600	+	—	—
Pleasantville	Filtered water	1/18/10	5	Trace	80	50	.046	.034	.001	0.20	2.00	45.7	33.0	0.90	230	—	—	—
Pleasantville	Tap, public supply	12/ 1/10	15	1	108	60	.008	.094	.001	0.10	4.25	58.6	58.0	2.40	1,000	+	+	+
Port Byron	Tap, public supply	2/16/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35,000	.....	.....	.....
Port Byron	Tap, public supply	4/18/10	20	5	210	190	.130	.194	.025	0.32	3.75	140.0	110.0	3.70	4,000	+	+	+
Port Byron	Tap, public supply	5/ 3/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51,800	+	+	.....
Port Byron	Tap, public supply	11/ 7/10	5	3	260	192	.134	.118	.032	1.20	6.25	128.6	119.0	1.30	275,000	+	+	+
Port Chester	Tap, public supply	1/14/10	18	Trace	55	38	.016	.154	.001	Trace	4.00	27.3	13.0	1.50	.....	.....	.....	.....
Port Henry	Tap, Witherbee Water Works	3/ 2/10	10	15	170	130	.008	.042	.001	0.20	2.50	120.0	112.5	2.10	475	—	—	—
Port Henry	Tap, public supply	3/ 2/10	20	Trace	85	58	.014	.062	.001	0.20	2.13	36.4	33.5	4.70	2,000	+	—	—
Port Henry	Tap, public supply	11/10/10	Trace	Clear	81	57	.014	.056	.001	0.20	2.00	55.7	55.0	3.70	130	+	+	—
Port Henry	Tap, Witherbee supply	11/10/10	Trace	5	154	126	.006	.048	.001	0.20	2.75	125.8	125.0	0.90	40	+	—	—
Port Jervis	Tap, public supply	10/19/10	15	2	46	24	.008	.080	.001	0.10	1.50	14.3	13.0	3.70	.....	+	—	—
Port Leyden	Tap, public supply	11/15/10	5	Clear	48	32	.004	.020	.003	1.44	1.00	22.1	19.0	0.30	50	+	—	—
Portville	Tap, public supply	3/21/10	1	Trace	36	22	.052	.046	.001	0.04	1.12	20.8	17.0	1.45	900	—	—	—
Portville	Tap, public supply	10/ 7/10	Trace	Clear	78	51	.006	.012	.002	0.20	0.50	48.6	46.5	0.50	80	+	+	+
Portville	Tap, public supply	12/14/10	5	2	42	22	.008	.016	.001	0.20	1.75	20.8	20.0	0.90	40	+	+	—
Potsdam	Public well	2/ 3/10	Trace	Clear	384	274	.004	.028	.003	1.00	19.50	264.5	251.0	1.20	1,000	—	—	—
Potsdam	Tap, public supply	2/28/10	30	5	40	25	.040	.208	.001	0.20	0.25	22.1	18.0	9.40	2,100	+	—	—
Potsdam	Tap, public supply	11/14/10	80	10	114	59	.010	.080	.001	0.10	1.25	19.5	17.0	15.30	1,600	+	+	—
Poughkeepsie	Raw Hudson river water	1/10/10	28	16	160	82	.052	.078	.003	0.20	9.75	67.1	57.0	9.20	8,000	+	+	+
Poughkeepsie	Filtered water	1/10/10	28	Clear	154	81	.034	.050	.002	0.20	10.25	66.4	57.0	9.20	55	—	—	—
Poughkeepsie	Tap, public supply	10/21/10	35	Clear	130	85	.016	.120	.001	0.08	9.50	72.9	68.0	9.40	10	+	—	—
Poughkeepsie	Raw water	11/29/10	40	30	134	78	.028	.108	.010	0.02	4.25	71.4	58.0	15.80	5,400	+	+	+
Poughkeepsie	Pure water, well	11/29/10	40	Trace	130	82	.010	.070	.002	0.02	4.75	70.0	55.0	11.90	41	+	—	—
Prattsburg	Reservoir	6/ 9/10	10	20	90	55	.004	.082	.002	0.40	1.25	47.1	42.0	2.10	8,300	+	—	—
Prattsburg	Stream	6/ 9/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,500	+	—	—
Pulaski	Tap, public supply	1/19/10	15	2	86	72	.018	.072	.003	0.36	2.00	55.7	.....	2.95	4,100	+	+	—
Pulaski	Tap, public supply	11/16/10	10	Trace	84	53	.014	.076	.001	0.40	2.25	40.3	38.0	3.40	2,000	+	+	+
Randall's Island	Tap, House of Refuge	11/12/10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	325	+	+	—
Randolph	Tap, public supply	3/22/10	10	Trace	52	30	.014	.050	.001	0.40	0.50	26.0	25.0	3.30	700	+	—	—
Randolph	Tap, public supply	10/10/10	30	5	84	38	.006	.228	Trace	0.20	0.50	37.7	34.0	9.40	52,000	+	+	+
Randolph	Tap, public supply	12/14/10	Trace	2	120	88	.008	.014	.001	0.30	0.75	87.1	87.0	1.00	140	+	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Ravena	Tap, public supply	2/ 8/10	5	3	102	77	.006	.032	.003	0.40	2.50	58.6	48.5	2.20	550	+	—	—	
Ravena	Tap, public supply	10/17/10	1	5	158	117	.004	.118	.002	Trace	2.25	117.2	117.0	1.30	130	+	—	—	
Ravena	Tap, public supply	12/21/10	5	Trace	162	127	.016	.022	.002	0.20	2.25	120.0	112.0	0.70	200	+	—	—	
Rensselaer	Raw Hudson river water	1/17/10	30	15	130	91	.152	.154	.005	0.30	4.25	64.3	60.0	12.00	11,500			+	+
Rensselaer	Chlorinated and coagulated applied	1/17/10													95			—	—
Rensselaer	Filtered water, unit No. 1	1/17/10													260			—	
Rensselaer	Filtered water, unit No. 5	1/17/10													60			—	
Rensselaer	Mixed effluents, units No. 1 and No. 5	1/17/10	10	10	133	88	.140	.122	.003	0.20	5.00	62.9	47.0	8.50					
Rensselaer	Raw Hudson river water	2/ 9/10													6,000	+	+	+	
Rensselaer	Force main at filter plant (purified water)	2/9/10													350	+	+	+	
Rensselaer	Tap at No. 36 Washington avenue	2/ 9/10	2	1	123	81	.106	.092	.001	0.10	3.75	53.6	24.0	9.60	230	+	+	+	
Rensselaer	Raw Hudson river water	3/ 2/10	12	250	85	58	.042	.204	.003	0.30	2.25	31.2	29.0	7.80	7,800			+	—
Rensselaer	Force main at filter plant (purified water)	3/ 2/10	1	Trace			.040	.028	.003	0.30	2.25	35.1	10.5	3.00	20	—	—	—	
Rensselaer	Raw Hudson river water	4/15/10	25	18	84	59	.030	.098	.005	0.04	1.75	33.8	30.0	9.30	7,000			+	+
Rensselaer	Distributed supply	4/15/10	Trace	Trace	71	48	.012	.054	.001	0.04	2.50	31.2	17.50	9.00	20	+	—	—	
Rensselaer	Effluent, unit No. 1	4/15/10													20	+	—	—	
Rensselaer	Effluent, unit No. 6	4/15/10													25	+	—	—	
Rensselaer	Raw Hudson river water	6/15/10	15	13	90	60	.018	.150	.002	0.04	1.50	35.1	31.0	7.20	12,500			+	+
Rensselaer	Effluent, unit No. 6	6/15/10													7	—	—	—	
Rensselaer	Filtered water	6/15/10	5	Clear	60	38	.008	.074	.001	0.04	1.75	31.2	18.0	7.00	8	—	—	—	
Rensselaer	Raw Hudson river water	7/25/10													18,500			+	+
Rensselaer	Tap, pumping station (purified water)	7/25/10													35	+	—		
Rensselaer	Filter effluent, unit No. 3	7/25/10													85	+	—		
Rensselaer	Effluent, unit No. 4	7/25/10													70	+	+	—	
Rensselaer	Effluent, unit No. 6	8/24/10	18	1	122	84	.016	.166	.001	0.08	3.30	55.7	32.0	9.50	90	+	—		
Rensselaer	Tap, pumping station (purified water)	8/24/10													110		+	—	
Rensselaer	Raw Hudson river water	8/24/10	45	10	127	75	.098	.280	.002	0.06	3.50	52.9	42.0	13.60	10,000		+	+	
Rensselaer	Raw Hudson river water	9/30/10													8,800			+	+
Rensselaer	Filtered water	9/30/10	15	Clear	176	89	.012	.108	.006	0.14	3.50	71.4	46.0	15.40	325	+	+	—	
Rensselaer	Raw Hudson river water	11/ 9/10	45	2	133	87	.032	.102	.003	0.04	2.50	62.9	52.0	19.60	12,500			+	+
Rensselaer	Filtered water	11/ 9/10	10	2	133	90	.036	.050	.003	0.04	3.50	60.0	38.0	9.20	350	+	+	—	

Rensselaer	Raw Hudson river water	11/25/10	30	25	136	86	.050	.088	.003	0.10	3.50	70.0	53.0	18.00	20,000			+	
Rensselaer	Filtered water	11/25/10	5	5	138	86	.050	.056	.001	0.10	3.00	67.1	45.0	12.40	350	+	+	+	
Rensselaer	Raw water	12/12/10	35	15	164	89	.130	.164	.003	0.10	6.50	67.1	62.0	20.80	25,000			+	+
Rensselaer	Filtered water	12/12/10	10	10	170	106	.126	.088	.003	0.10	5.75	65.7	43.0	16.40	500	+	+	−	
Rhinebeck	Tap, residence C. S. Van Etten	8/5/10													16,500	+	+	−	
Rhinebeck	Tap, residence G. C. Lang	8/5/10													6,500	+	+	−	
Richfield Springs	Tap, public supply	11/19/10	10	10	123	96	.004	.148	.001	0.20	1.50	95.7	92.0	3.20	400	−	−	−	
Richford	Tap, public supply	7/19/10	5	12	50	32	.004	.044	.001	0.30	0.75	29.9	28.5	1.10	13,500	+	+	+	
Richford	Tap, public supply	11/29/10	Trace	Trace	31	29	.010	.026	Trace	0.40	1.00	16.9	16.0	3.20	11	+	−	−	
Richmondville	Tap, public supply	4/26/10	3	Trace	64	44	.002	.048	.003	0.10	0.87	28.6	28.0	1.40	650	+	−	−	
Richmondville	Tap, public supply	11/4/10	12	2	95	85	.006	.046	.002	0.02	2.50	67.1	66.0	1.80	700	+	+	−	
Ripley	Tap, public supply	3/24/10	1	5	63	56	.004	.044	.001	0.40	1.25	33.8	24.0	0.30	6,900	+	+	+	
Ripley	Tap, public supply	10/10/10	Trace	10	174	113	.014	.138	.002	0.10	3.25	81.4	70.0	1.60	400	+	+	+	
Ripley	Tap, public supply	12/15/10	10	3	88	57	.010	.076	.001	0.50	2.75	45.7	39.0	1.80	120	+	+	−	
Rome	Tap, sample No. 1	2/10/10													600	−	−	−	
Rome	Tap, sample No. 2	2/10/10													1,200	−	−	−	
Rome	Rome Textile Knitting Mill	5/11/10													170	+	−	−	
Rome	Drs. Reid & Stronahan's office	5/11/10													180	−	−	−	
Rome	Fish Creek dam	6/29/10													2,600	+	−	−	
Rome	Columbia Knitting Mill	5/11/10													50	+	−	−	
Rome	Reservoir, city water works	6/29/10													2,000	−	−	−	
Rome	Driven well	6/29/10													22,000	−	−	−	
Rome	Tap, textile works	8/27/10													600	+	+	−	
Rome	Tap at Empire House	8/27/10													230	+	+	−	
Rome	Tap, public supply	10/27/10	5	5	71	48	.012	.100	.001	0.06	0.375	45.7	42.0	7.40	160	+	−	−	
Rome	City water before being pumped to towers	11/5/10													30	−	−	−	
Rome	Rome Custodial Asylum, public supply	11/5/10	70	Trace	62	31	.006	.116	.001	0.10	0.50	29.9	28.0	10.00	110	+	−	−	
Rome	Tap, public supply	12/23/10	Trace	Clear	55	35	.008	.036	.001	0.50	0.50	35.1	34.0	3.75	170	+	−	−	
Rosendale	Tap, public supply	7/6/10	Trace	Clear	64	45	.006	.038	.002	0.40	2.25	42.9	38.0	0.53	3,100	+	−	−	
Round Lake	Outlet at pond near intake	6/16/10	5	2	110	73	.006	.016	.002	0.04	0.75	71.4	70.0	1.00	500	+	+	−	
Round Lake	Tap, public supply	6/16/10													140	−	−	−	
Round Lake	Tap, public supply	12/1/10	10	5	102	76	.006	.022	.002	0.60	0.75	75.7	75.0	1.00	350	+	−	−	
Rouses Point	Tap, public supply	1/11/10													6,200	+	+	+	
Rouses Point	Lake Champlain, mouth of intake pipe	1/21/10	15	10	65	54	.048	.088	.003	0.06	2.25	51.4	27.0	3.00					
Rouses Point	Lake Champlain midway between sewer outlet and mouth of intake pipe	1/26/10													3,200	+	+	−	
Rouses Point	Lake Champlain, two miles above village	2/25/10	2	Trace	77	51	.020	.060	.003	0.30	1.25	45.7	43.0	5.00	150	+	−	−	
Rouses Point	Lake Champlain, near intake pipe line of intake, 1,800 feet from shore	2/25/10													200	−	−	−	
Rouses Point	Lake Champlain, 1,200 feet from shore near intake	3/1/10	10	3	70	45	.052	.086	.003	0.20	0.75	40.3	39.5	3.50	290	+	+	−	
Rouses Point	Lake Champlain, channel 1,800 feet from shore	3/1/10	10	8	70	47	.044	.076	.003	0.20	1.50	41.0	39.5	4.00	650	+	+	−	
Rouses Point	Tap, public supply	3/1/10													4,000	+	+	+	
Rouses Point	Tap in convent school	6/3/10													60	+	−	−	
Rouses Point	Tap in public school	6/3/10													20	+	−	−	
Rouses Point	Tap, public supply	6/3/10	Trace	2	66	44	.012	.062	.001	0.10	1.00	40.3	38.0	1.00	60	+	−	−	

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Rouses Point	Tap, public supply	11/11/10	2	5	84	46	.014	.054	.002	0.20	1.25	45.7	45.0	2.75	160	+	+	+	..
Rye	Tap, public supply	5/ 6/10	12	10	60	37	.020	.144	.001	0.02	3.25	18.2	11.0	1.90	140	—	—	—	..
Salamanca	Tap, public supply	3/21/10	5	3	26	21	.012	.022	.003	Trace	1.00	12.7	6.00	1.00	2,100	+	—	—	..
Salamanca	Tap, public supply	5/27/10	Trace	5	40	28	.002	.012	.001	Trace	1.00	19.5	18.0	1.00	8,700	+	—	—	..
Salamanca	Tap, public supply	10/ 8/10	8	20	46	30	.010	.096	Trace	.008	1.50	19.5	19.0	2.00	3,400	+	+	+	..
Salamanca	Tap, public supply	12/14/10	5	2	29	12	.004	.010	.001	0.04	1.50	11.1	9.00	0.80	120	+	—	—	..
Sandy Creek	Tap, public supply	11/18/10	Trace	Trace	40	31	.006	.048	.002	1.20	1.25	31.2	30.0	1.40	475	+	—	—	..
Sandy Hill	Tap, public supply	2/ 3/10	5	Trace	88	55	.028	.042	.002	1.20	3.75	39.00	35.0	2.60	600	—	—	—	..
Saratoga Springs	Tap, public supply	2/ 3/10	......	......	105	84	.020	.160	.003	0.20	1.50	70.0	70.0	1.50	10	—	—	—	..
Saratoga Springs	Tap 430 Broadway	8/ 5/10	......	......	......	......	......	......	......	......	......	......	......	......	500	+	—	—	..
Saratoga Springs	Tap 150 Phila street	8/ 5/10	......	......	......	......	......	......	......	......	......	......	......	......	400	—	....	....	..
Saratoga Springs	Public fountain (Canfield)	8/ 5/10	......	......	......	......	......	......	......	......	......	......	......	......	425	—	—	—	..
Saratoga Springs	Tap, public supply	11/25/10	5	2	90	70	.006	.044	.002	Trace	1.12	68.6	67.0	1.20	350	—	—	—	..
Saratoga Springs	Tap, public supply	12/28/10	1	10	110	89	.008	.042	.003	0.10	1.00	88.6	81.5	2.35	60	—	—	—	..
Saugerties	Tap, public supply	10/18/10	2	5	30	16	.002	.026	.001	0.04	1.50	14.3	13.0	1.20	700	—	—	—	..
Saugerties	Tap, public supply	12/21/10	5	Trace	23	15	.004	.008	.002	0.20	1.50	15.6	12.0	0.50	550	+	+	—	..
Schenectady	Brandywine Ice Co	6/17/10	......	......	......	......	......	......	......	......	......	......	......	......	240	—	—	....	..
Schenectady	Wheeler Ice Co	6/17/10	......	......	......	......	......	......	......	......	......	......	......	......	550	+	+	....	..
Schenectady	Tap, public supply	9/ 1/10	Trace	Clear	198	144	.010	.008	.002	0.10	3.88	120.0	105.0	0.50	30	+	—	—	..
Schenectady	Tap, public supply	11/ 2/10	Trace	Clear	210	162	.008	.010	.002	0.10	4.25	128.6	123.0	1.00	14	+	—	—	..
Schenevus	Tap, public supply	7/23/10	5	8	34	20	.016	.050	Trace	0.08	0.875	18.2	14.0	0.90	1,000	+	—	—	..
Schuylerville	Tap, public supply	2/ 3/10	3	Trace	115	85	.012	.012	.002	0.50	0.75	81.4	80.0	1.20	110	—	—	—	..
Schuylerville	Tap, public supply	9/14/10	Trace	Clear	127	100	.008	.024	.001	0.60	0.75	92.9	92.0	0.40	1,800	+	+	—	..
Schuylerville	Tap, public supply	12/ 1/10	5	Clear	125	97	.006	.022	.002	0.50	0.50	97.1	96.0	0.70	50	—	—	—	..
Scotia	Fountain on Main street, public supply	9/ 1/10	1	Clear	193	125	.006	.018	.002	1.20	2.25	111.4	100.0	0.10	10	—	—	—	..
Scotia	Tap, fountain on Main street, public supply	11/ 2/10	Trace	Clear	187	134	.006	.008	.002	0.60	2.50	120.0	117.0	0.50	34	—	—	....	..
Seneca Falls	Tap, public supply	1/11/10	3	4	281	251	.024	.066	.003	0.28	54.8	148.6	......	1.40	5,900	+	+	....	..
Seneca Falls	Tap, public supply, 91 Falls street	2/ 8/10	2	1	256	222	.014	.064	.003	Trace	41.00	131.4	......	1.76	130	....	....	+	..
Seneca Falls	Tap, public supply	4/18/10	3.0	10	219	202	.004	.082	.001	0.32	37.50	114.2	......	2.30	90	—	—	—	..
Seneca Falls	Tap, public supply	6/26/10	Trace	1	219	177	.008	.080	.004	0.30	37.00	105.8	86.0	2.00	7,400	—	—	—	..
Seneca Falls	Tap, public supply	9/20/10	2	Trace	222	140	.012	.152	.002	Trace	43.25	61.4	55.0	1.74	100	+	—	—	..
Seneca Falls	Tap, public supply	10/22/10	2	Trace	219	188	.030	.136	.002	0.04	44.0	88.6	78.0	0.90	400	+	—	—	..

Seneca Falls	Tap, public supply	12/19/10	Trace	Trace	348	219	.008	.084	.001	0.20	45.0	140.0	108.0	0.80	210	—	—	—
Sherman	Tap, public supply	3/23/10	Trace	Clear	128	94	.004	.028	.001	1.60	1.00	84.3	75.0	.9	6,400	—	—	—
Sidney	Collar pond supply	1/26/10	20	10	46	28	.004	.052	.003	0.30	1.00	23.4	19.50	3.80	3,600	+	+	+
Sidney	Peckham brook system	1/26/10	Trace	Trace	40	29	.012	.054	.001	Trace	0.25	27.3	26.5	0.90	2,500	+	+	—
Sidney	Collar pond supply	4/27/10	Trace	Clear	36	20	.006	.052	.001	0.02	1.00	14.3	9.00	1.00	140	—	—	—
Sidney	Peckham brook system	4/27/10	5	Clear	45	25	.008	.036	.005	Trace	1.00	19.5	10.5	1.00	60	—	—	—
Sidney	Gillette supply	7/21/10	3	Trace	40	25	.004	.070	.003	Trace	0.50	27.3	22.5	1.30	200	—	—	—
Sidney	Peckham brook supply	7/21/10	20	10	60	40	.008	.072	.006	0.30	0.75	33.8	24.5	3.10	300	—	—	—
Sidney	Collar pond supply	10/ 4/10	2	Clear	38	28	.012	.038	.002	0.08	0.875	37.3	25.0	1.30	120	+	+	—
Sidney	Peckham brook supply	10/ 4/10	2	Clear	46	27	.006	.024	.002	0.08	0.875	26.0	26.0	1.40	30	+	+	—
Sidney	Collar pond supply	12/ 8/10	Trace	Trace	42	21	.008	.052	Trace	0.36	1.75	20.8	16.0	2.00	50	—	—	—
Sidney	Peckham brook supply	12/ 8/10	10	3	46	26	.076	.108	Trace	0.16	1.75	24.7	15.00	4.30	400	+	—	—
Silver Creek	Tap, public supply	3/25/10	10	15	91	57	.012	.046	.001	0.40	1.25	40.3	29.0	2.10	4,100	+	—	—
Silver Springs	Tap, public supply	3/16/10	40	Trace	190	163	.012	.054	.003	0.30	0.75	154.2	144.0	7.00	550	—	—	—
Silver Springs	Artesian well	10/18/10	15	5	1,560	1,170	.420	.058	.003	0.02	565.0	378.5	179.0	0.50	10	—	—	—
Silver Springs	Tap, public supply	12/15/10	15	5	97	63	.010	.070	.001	0.24	2.50	60.0	55.0	2.10	700	+	+	+
Sinclairville	Tap, public supply	3/23/10	Trace	Clear	136	109	.076	.072	.002	1.60	4.00	97.1	85.0	1.00	2,200	+	—	—
Skaneateles	Tap, public supply	2/ 8/10	3	1	130	117	.004	.052	.003	Trace	1.25	94.2	......	0.84	1,200	+	—	—
Skaneateles	Tap, public supply	4/ 5/10	......	......	......	......	......	......	......	......	......	......	......	......	14	—	—	—
Skaneateles	Tap, public supply	4/18/10	Trace	5	121	97	.002	.040	.001	0.40	1.50	91.4	88.0	1.90	110	—	—	—
Skaneateles	Tap, public supply	5/18/10	3	Clear	111	94	.002	.046	.002	0.30	1.50	92.8	92.0	1.40	11	—	—	—
Skaneateles	Tap, public supply	6/28/10	Trace	Trace	112	104	.002	.022	.004	0.30	1.00	97.2	90.0	1.00	3,500	—	—	—
Skaneateles	Tap, Skaneateles Water Supply Company	6/28/10	Trace	Clear	121	91	.002	.020	.002	0.40	0.75	90.0	89.0	0.70	470	—	—	—
Skaneateles	Tap, public supply (old supply)	10/ 5/10	Trace	Trace	125	108	.008	.078	.001	0.24	0.75	82.9	83.0	0.30	80	—	—	—
Skaneateles	Tap, public supply (new supply)	10/ 5/10	2	5	123	104	.002	.050	.002	0.24	0.75	83.2	82.0	0.20	170	—	—	—
Slingerlands	Tap, public supply	2/ 1/10	7	5	155	120	.008	.016	.001	0.60	1.50	114.2	97.0	1.90	550	+	—	—
Slingerlands	Tap, public supply	4/25/10	3	3	140	121	.006	.010	.001	0.10	1.00	90.0	90.0	0.50	300	+	—	—
Slingerlands	Tap, public supply	11/ 4/10	Trace	10	246	193	.006	.068	.002	0.30	2.25	174.2	164.0	0.90	200	+	—	—
Smyrna	Tap	5/ 6/10	Trace	Clear	377	287	.004	.016	.003	4.80	28.00	235.5	180.0	0.50	17	+	—	—
Smyrna	Inflow well above reservoir	7/ 7/10	Trace	Clear	93	65	.004	.066	.002	2.00	1.75	60.0	57.0	0.20	19,000	—	—	—
Smyrna	Force pump at main well	7/ 7/10	Trace	Clear	355	280	.004	.050	.001	4.00	28.75	214.5	202.0	0.30	29,000	—	—	—
Smyrna	Tap in pump house at well	10/26/10	Trace	Trace	334	241	.008	.024	.002	3.50	17.50	221.5	216.0	0.10	30	—	—	—
Smyrna	Tap, public supply	12/25/10	Trace	Trace	317	251	.032	.040	.002	1.60	14.00	228.5	188.5	1.00	400	—	—	—
Solvay	Tap, public supply	1/17/10	Trace	Trace	1,682	1,397	Trace	.014	.001	0.04	6.37	941.5	......	0.20	10	—	—	—
Solvay	Tap, public supply	4/21/10	2	Clear	1,060	960	.002	.014	.001	1.00	4.25	845.0	......	1.00	55	—	—	—
Solvay	Tap, public supply	5/26/10	Trace	Clear	1,217	974	.008	.016	.002	2.40	4.00	780.0	200.0	1.00	80	—	—	—
Solvay	Tap, public supply	6/28/10	Trace	Trace	1,293	989	.002	.008	.002	3.00	5.50	700.0	236.0	0.20	400	—	—	—
Solvay	Tap, public supply	9/ 9/10	Trace	Clear	1,266	1,092	.004	.076	.001	2.00	5.00	714.0	210.0	0.10	3,500	+	—	—
Solvay	Tap, public supply	11/ 7/10	......	......	......	......	......	......	......	......	......	......	......	......	1,200	+	+	—
Solvay	Tap, public supply	12/ 7/10	Trace	Trace	1,338	1,078	.008	.162	.005	2.00	8.75	814.0	187.0	0.70	60	—	—	—
Sonyea	Sample marked No. 1	6/14/10	......	......	......	......	......	......	......	......	......	......	......	......	140	+	—	—
Sonyea	Sample marked No. 2	6/14/10	......	......	......	......	......	......	......	......	......	......	......	......	90	—	—	—
Sonyea	Water tower, spring water	6/14/10	......	......	......	......	......	......	......	......	......	......	......	......	140	+	—	—
Sonyea	Sample marked No. 3	6/14/10	......	......	......	......	......	......	......	......	......	......	......	......	10	—	—	—
Sonyea	Sample marked No. 4	6/14/10	......	......	......	......	......	......	......	......	......	......	......	......	20	—	—	—
Sonyea	Creek at intake	6/14/10	7	1	200	168	.024	.074	.002	Trace	5.25	168.6	150.0	1.50	......	......	......	......
Sonyea	Tap	6/14/10	Trace	Clear	458	356	.180	.038	.003	0.40	24.50	300.0	278.0	1.00	......	......	......	......

Analytical Results of Samples of Water — (*Continued*)

City, Town or Village	Source	Date	Color	Turbidity	Residue on evaporation	Minera residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (−=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Sonyea	Spring	7/ 7/10	...	...	...	...	...	...	...	...	...	...	...	...	1,900	−	−	−	..
Sonyea	Pump house over spring	7/ 7/10	...	...	...	...	...	...	...	...	...	...	...	...	3,400	−	−	−	..
Sonyea	Kishaqua creek intake	7/ 7/10	...	...	...	...	...	...	...	...	...	...	...	...	2,900	+	+	−	..
Sonyea	Kishaqua creek above gorge	7/ 7/10	...	...	...	...	...	...	...	...	...	...	...	...	1,000	+	+	−	..
Sonyea	Kishaqua creek at intake	7/20/10	3	Clear	249	169	.032	.080	Trace	Trace	6.33	151.4	128.0	0.50	800	+	+	−	..
Sonyea	Craig Colony spring	10/28/10	Trace	Trace	501	387	.394	.092	.003	0.30	28.40	314.5	314.0	0.70	10	+	−	−	..
Sonyea	Tap, springs on flats	11/26/10	Trace	Trace	498	416	.400	.040	.001	0.24	34.50	260.0	...	4.80	9	−	−	−	..
Sonyea	Kishaqua creek	12/13/10	Trace	Trace	280	201	.004	.044	.001	0.20	7.00	188.6	133.0	0.40	125	+	+	−	..
South Glens Falls	Tap, public supply	2/ 3/10	1	Trace	68	38	.018	.020	.003	1.00	2.37	24.7	24.0	1.00	100	−	−	−	..
South Glens Falls	Tap, public supply	9/13/10	Trace	Clear	56	29	.002	.014	.002	1.44	2.00	27.3	21.0	0.10	1,800	+	+	...	..
South Glens Falls	Tap, public supply	12/28/10	Trace	Clear	88	50	.012	.016	.001	0.80	2.50	26.0	19.5	1.00	1,000	+	+	−	..
Spencerport	Well, sample marked No. 1	5/ 5/10	...	...	...	...	...	...	...	...	...	...	...	...	5,500	−	−	−	..
Spencerport	Well, sample marked No. 2	5/ 5/10	...	...	...	...	...	...	...	...	...	...	...	...	23,500	−	−	−	..
Spring Valley	Tap, public supply	7/ 8/10	Trace	Clear	117	93	.004	.006	.001	0.80	3.00	85.7	80.0	0.20	7,000	−	−	−	..
Spring Valley	Tap, public supply	10/22/10	Clear	Trace	130	87	.002	.010	.002	0.30	2.50	85.7	85.0	0.25	200	−	−	−	..
St. Johnsville	Tap, public supply	4/ 6/10	5	Trace	140	123	.008	.040	.001	0.50	1.75	108.6	100.0	0.70	80	−	−	−	..
St. Johnsville	Tap, public supply	7/ 1/10	Trace	Clear	125	115	.004	.024	.001	0.10	0.75	115.8	102.0	2.50	400	+	+	−	..
St. Johnsville	Tap, public supply	8/30/10	Trace	Clear	127	107	.008	.024	.001	0.24	1.00	91.4	90.0	0.34	180	+	+	−	..
St. Johnsville	Tap, public supply	11/ 1/10	Trace	Trace	137	108	.004	.016	.001	0.20	1.00	108.6	107.0	0.60	20	+	+	−	..
St. Johnsville	Tap, public supply	12/30/10	5	3	125	102	.012	.012	.001	0.30	0.25	101.5	101.5	1.00	380	+	+	−	..
Suffern	Tap, public supply	7/ 8/10	10	1	91	68	.018	.076	.001	.10	2.50	67.1	67.0	1.75	43,600	+	−	−	..
Suffern	Lake Antrim	7/ 8/10	10	1	97	70	.026	.086	.003	0.10	2.87	67.8	68.0	1.75	24,000	−	−	−	..
Suffern	Tap, public supply	10/22/10	5	Trace	102	80	.010	.070	.002	0.02	3.25	78.6	78.0	1.50	2,100	+	+	−	..
Suffern	Well, public supply	10/22/10	...	...	...	...	...	...	...	...	...	...	...	...	600	+	+	−	..
Suffern	Lake Antrim	10/22/10	...	...	...	...	...	...	...	...	...	...	...	...	500	+	+	+	..
Syracuse	Tap, public supply	4/21/10	2	Clear	122	110	.004	.042	.001	0.30	1.50	97.2	...	0.94	130	−	−	−	..
Syracuse	Tap, institution supply	5/ 5/10	5	3	169	123	.060	.064	.020	1.00	1.75	98.6	92.0	1.00	9,800	+	+	+	..
Syracuse	Tap, institution supply	5/26/10	3	2	120	102	.006	.048	.001	...	1.50	100.0	89.0	1.60	12	−	−	−	..
Tarrytown	Raw water	1/14/10	...	...	...	...	...	...	...	...	...	...	...	...	240	−	−	−	..
Tarrytown	Raw water and chlorine	1/14/10	...	...	...	...	...	...	...	...	...	...	...	...	7	−	−	−	..
Tarrytown	Low pressure, filter effluent	1/14/10	...	...	...	...	...	...	...	...	...	...	...	...	220	−	−	−	..
Tarrytown	High pressure, mixed effluent	1/14/10	3	Clear	79	65	.006	.080	.003	0.04	5.25	41.60	31.5	0.40	230	−	−	−	..
Tarrytown	Raw water, Tarrytown lake	3/12/10	6	10	50	42	.026	.064	.002	0.10	4.25	40.3	22.0	2.40	650	+	−	...	..

Tarrytown	Filtered, low pressure	3/12/10													90	—	—	
Tarrytown	Filtered, high pressure	3/12/10													60	—	—	
Tarrytown	Filtered, mixed high and low	3/12/10	Trace	Clear	76	55	.014	.046	.002	0.10	4.50	32.5	19.0	1.00				
Tarrytown	Raw water, Tarrytown lake	4/28/10	5	1	80	53	.040	.068	.001	0.20	4.25	32.5	27.0	1.00	425	+	+	+
Tarrytown	Filtered, low pressure	4/28/10													350	+	—	—
Tarrytown	Filtered, high pressure	4/28/10													650	+	+	+
Tarrytown	Mixed effluents	4/28/10	Trace	Clear	65	44	.012	.040	.001	0.10	5.00	31.2	21.5	0.30				
Tarrytown	Raw water, Tarrytown lake	7/26/10	10	5	85	61	.016	.110	.001	0.02	5.00	38.0	26.5	1.30	1,400	+	—	—
Tarrytown	Effluents of low service filters	7/26/10	5	5	81	65	.006	.048	.001	0.02	6.37	52.9	25.5	0.90	330	+	—	—
Tarrytown	Effluents of high service filters	7/26/10													250	—	—	—
Tarrytown	Raw water	9/21/10	18	5	79	44	.016	.144	.001	Trace	5.25	35.1	34.0	2.61	70	+	+	—
Tarrytown	Low pressure system	9/21/10													80	+	+	—
Tarrytown	Raw water (east view)	10/21/10													110	+	+	—
Tarrytown	Low pressure filters	10/21/10	2	Clear	104	74	.034	.102	.002	0.04	6.25	52.9	18.0	0.60	20	—	—	—
Tarrytown	Mixed effluents (high pressure)	10/21/10													20	+	—	—
Tarrytown	Raw water	11/30/10	30	10	89	56	.016	.116	.001	Trace	5.50	55.7	37.0	0.85	350	—	—	—
Tarrytown	Low effluent	11/30/10													55	—	—	—
Tarrytown	High effluent	11/30/10													140	—	—	—
Tarrytown	Mixed effluent, high and low	11/30/10	5	5	94	67	.014	.046	.001	Trace	5.50	62.9	23.0	0.45				
Thousand Island Park	Tap in kitchen of Columbia Hotel	8/27/10	Trace	Trace	129	94	.008	.084	.002	0.02	6.37	90.0	88.0	1.85	6,800	—	—	—
Thousand Island Park	Tap in lavatory of Columbia Hotel	8/27/10													2,000	+	+	+
Tonawanda	Tap, public supply	2/15/10	5	6	140	112	.008	.060	.004	Trace	7.00	100.0	96.0	1.80	425		—	—
Tonawanda	Tap, public supply	6/22/10	2	5	152	107	.014	.056	.004	0.10	8.00	91.4	88.0	2.30	33,000	+	+	—
Tonawanda	Tap, public supply	10/11/10	Trace	5	130	109	.010	.102	.002	Trace	6.50	105.8	100.0	1.80	700	+	+	—
Tonawanda	Tap, public supply	12/17/10	5	25	165	125	.008	.092	.002	0.04	6.25	120.0	100.0	1.80	500	+	+	—
Troy	Tap, high service	1/ 3/10	10	3	47	30	.016	.110	.004	0.14	2.00	20.8	12.0	4.90	110	+	—	—
Troy	Tap, low service	1/ 3/10	10	3	52	38	.116	.112	.005	0.50	1.25	27.3	20.0	5.00	90	+	—	—
Troy	Tap, high service	4/14/10	10	5	60	39	.016	.096	.001	0.30	1.62	31.2	15.0	4.50	500	+	+	—
Troy	Tap, low service	4/14/10	10	10	75	52	.026	.100	.003	0.30	1.25	32.5	30.0	5.00	550	+	+	—
Troy	Tap, high service	6/16/10	5	10	58	38	.010	.110	.001	0.20	0.75	31.2	25.0	3.40	45	+	+	—
Troy	Tap, low service	6/16/10	10	20	57	37	.018	.152	.004	0.30	1.00	29.9	19.0	4.00	450	+	—	—
Troy	Tap, high service	9/ 1/10	5	13	64	29	.194	.206	.026	0.18	1.25	26.0	24.0	5.08	2,400	+	+	—
Troy	Tap, low service	9/ 1/10	Trace	17	70	30	.078	.190	.024	0.32	1.55	26.0	24.0	3.81	400	+	—	—
Troy	Tap, high service	10/28/10	20	20	54	30	.004	.156	.003	Trace	1.25	23.4	18.0	4.10	180	+	+	—
Troy	Tap, low service	10/28/10	17	10	71	47	.004	.096	.001	0.240	1.25	28.6	28.0	3.80	210	+	+	—
Troy	Tap, high service	12/ 9/10	20	5	58	36	.010	.132	.003	0.10	1.50	22.1	17.0	3.60	375	+	—	—
Troy	Tap, low service	12/ 9/10	20	5	59	29	.022	.150	.003	0.30	1.25	27.3	25.0	6.60	275	+	+	—
Tully	Tap, public supply	9/ 8/10	Trace	Clear	258	218	.008	.118	.002	0.96	5.25	182.9	178.0	0.20	1,700		+	+
Tully	Pump head	10/15/10	Trace	Clear	281	192	.012	.032	.003	0.60	6.50	180.0	178.0	1.00				
Tuxedo	Tap, public supply	7/ 8/10													5,200	—	—	—
Tuxedo	Tap, public supply	10/22/10	2	Trace	43	26	.014	.120	.002	0.02	2.25	22.1	15.0	3.00	3,700	+	—	—
Unadilla	Martin brook supply	1/27/10	5	Clear	25	16	.006	.030	.002	0.20	1.00	15.6	5.0	1.50	475	+	—	—
Unadilla	Kilkenny supply	1/27/10	7	3	35	25	.010	.032	.001	0.20	1.25	18.2	8.0	1.50	800	—	—	—
Unadilla	Martin brook supply	4/27/10	15	20	45	25	.018	.086	.001	0.02	1.00	19.5	14.0	2.70	140	+	—	—
Unadilla	Kilkenny supply	4/27/10	Trace	Trace	37	25	.004	.038	.004	Trace	1.00	12.7	12.5	0.80	130	—	—	—
Unadilla	Martin brook supply	7/21/10	3	Trace	60	46	.004	.104	.001	Trace	0.375	36.4	36.0	1.70	300	—	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Unadilla	Kilkenny supply	7/21/10	1	5	60	41	.020	.090	Trace	Trace	0.375	31.2	28.5	1.20	200	—	—	—	..
Unadilla	Martin brook supply	10/ 4/10	20	2	63	33	.066	.138	.002	0.06	2.00	31.2	29.0	3.70	1,300	+	+	—	..
Unadilla	Kilkenny supply	10/ 4/10	12	3	65	35	.010	.132	.001	0.40	2.25	33.1	33.0	2.60	550	+	+	—	..
Unadilla	Martin brook supply	12/ 7/10	5	3	41	26	.008	.064	Trace	0.16	1.50	20.8	13.0	2.20	475	+	+	+	..
Unadilla	Kilkenny supply	12/ 7/10	Trace	5	44	30	.058	.058	.001	0.10	1.25	23.4	17.0	3.60	180	+	—	—	..
Union	Tap, public supply	3/14/10	Trace	Trace	60	50	.002	.016	.002	1.32	1.87	19.5	......	0.67	34	—	—	—	..
Union	Tap, public supply	5/16/10	5	Clear	443	338	.008	.008	.004	4.32	13.00	243.0	206.0	1.10	......	—	—	—	..
Union	Tap, public supply	7/13/10	Trace	Clear	389	280	.002	.006	.001	1.00	16.25	221.5	202.0	0.20	5,800	—	—	—	..
Union	Tap at house of R. C. Atwood	8/ 5/10	......	......	......	......	......	......	......	......	......	......	......	......	1,200	—	—	—	..
Union	Tap at house of Dr. Christopher	8/ 5/10	......	......	......	......	......	......	......	......	......	......	......	......	1,000	—	—	—	..
Union	Tap, public supply	9/13/10	Trace	Trace	486	324	.006	.064	.001	4.80	11.75	257.0	203.0	0.15	1,000	+	+	—	..
Union	Well water	10/14/10	Trace	Trace	510	347	.002	.042	.010	1.60	18.50	260.0	242.0	0.70	6,400	+	+	+	..
Union	Tap public supply	10/14/10	......	......	......	......	......	......	......	......	......	......	......	......	120	—	—	—	..
Union	Tap, public supply	12/ 9/10	......	......	......	......	......	......	......	......	......	......	......	......	1,270	—	—	—	..
Utica	Tap, southern watershed supply	1/ 6/10	Trace	1	221	181	.012	.040	.005	0.30	0.80	145.8	140.0	0.80	600	+	+	—	..
Utica	Tap, West Canada supply	1/ 6/10	20	Trace	50	24	.052	.074	.002	0.30	1.00	23.4	19.0	4.00	170	+	—	—	..
Utica	Tap, southern watershed supply	4/ 7/10	15	13	72	48	.022	.042	.001	0.20	1.00	32.5	28.0	1.80	120	—	—	—	..
Utica	Tap, West Canada supply	4/ 7/10	20	3	51	36	.014	.056	.001	0.30	0.25	20.8	9.0	4.10	260	—	—	—	..
Utica	Tap, southern watershed supply	6/21/10	20	10	83	58	.004	.080	.001	0.30	2.00	41.6	34.0	5.00	600	+	+	—	..
Utica	Tap, West Canada supply	6/21/10	20	5	45	29	.010	.096	.002	0.10	......	15.6	12.0	6.00	2,700	—	—	—	..
Utica	Tap, southern watershed supply	8/30/10	35	3	54	28	.004	.086	.001	0.10	0.25	20.8	16.0	1.70	600	+	+	+	..
Utica	Tap, West Canada supply	8/30/10	35	1	64	42	.016	.116	.001	0.10	0.25	27.0	18.0	6.56	120	+	+	+	..
Utica	Tap, West Canada supply	10/26/10	40	2	59	32	.002	.058	.001	0.12	0.25	23.4	23.0	6.50	50	+	+	—	..
Utica	Tap, southern watershed supply	10/26/10	35	5	60	39	.004	.112	.001	0.14	0.25	29.9	29.0	5.60	60	+	+	—	..
Utica	Tap, West Canada supply	11/15/10	50	2	47	22	.008	.066	.001	0.16	0.75	20.8	29.0	14.50	70	+	—	—	..
Utica	Tap, southern watershed	11/15/10	30	10	93	59	.008	.108	.001	0.10	1.50	45.7	44.0	3.40	1,400	+	+	—	..
Utica	Tap, West Canada supply	12/23/10	20	1	59	34	.026	.098	.001	0.36	0.75	29.9	26.0	6.00	140	—	—	—	..
Utica	Tap, southern watershed supply	12/23/10	5	5	125	86	.004	.094	.001	0.16	0.75	60.0	56.0	2.75	210	+	—	—	..
Valatie	Tap, public supply	9/ 2/10	5	4	81	44	.006	.208	.001	0.04	1.25	42.9	42.0	3.70	500	+	—	—	..
Valatie	Tap, public supply	11/12/10	5	2	81	51	.016	.180	.002	Trace	2.00	48.6	46.0	3.00	450	+	+	+	..
Victor	Tap, public supply	9/20/10	1	Clear	589	403	.010	.024	.002	1.92	4.50	321.5	217.0	0.09	100	+	+	—	..
Voorheesville	Tap, public supply	2/ 1/10	8	6	180	125	.008	.018	.001	0.60	2.00	101.5	89.0	0.60	950	+	—	—	..
Voorheesville	Tap, public supply	11/ 5/10	Trace	20	196	156	.004	.092	.001	0.40	8.75	131.4	127.0	1.70	1,500	+	+	+	..

Walden	Tap, public supply	7/ 6/10	Trace	Clear	229	186	.004	.054	.002	1.00	3.75	162.8	127.0	0.50	70,000	+	—	—
Warsaw	Tap, public supply	3/15/10	10	5	92	70	.002	.046	.002	0.80	1.25	60.0	51.0	3.50	1,800	+	—	—
Warwick	Greenwood lake	5/ 3/10													2,300	+	+	—
Warwick	Well at Windemere Hotel	5/ 3/10													15,000	—	—	—
Warwick	Tap, public supply	10/20/10	10	5	108	95	.016	.110	.003	0.10	1.75	94.3	87.0	2.50	1,700	+	+	—
Waterloo	Tap, Dr. Bellows' residence	1/10/10													110,000			
Waterloo	Tap, public supply, 71 Main street	1/10/10	8	5	263	247	.068	.072	.004	0.02	58.00	120.0		1.65	96,000	+	+	+
Waterloo	Tap, public supply	4/18/10	2	5	244	215	.016	.096	.005	0.30	51.35	101.5		1.70	48,000	+	+	—
Waterloo	Tap, public supply	6/27/10	Trace	1	240	168	.028	.134	.010	0.30	52.00	105.8	97.0	1.80	30,500	+	—	—
Waterloo	Tap, public supply	9/20/10	3	5	253	201	.026	.118	.012	0.24	54.75	100.0	98.0	1.30	11,000	+	+	+
Waterloo	Tap, public supply	10/22/10	5	Trace	240	196	.052	.106	.009	0.20	54.00	100.0	90.0	1.10	700	+	+	+
Waterloo	Tap, public supply	12/19/10	Trace	Trace	232	198	.010	.060	.003	0.20	55.00	108.0	95.0	0.50	14,500	+	+	+
Watertown	Tap, public supply	2/25/10	1	Trace	83	63	.026	.050	.003	0.20	0.75	39.0	5.5	5.00	130	—	—	
Waterville	Tap, public supply	11/19/10	5	10	100	78	.012	.110	.001	0.20	0.75	61.4	59.0	2.70	850	+	—	—
Watervliet	Tap, Sixteenth street	1/ 3/10	10	30	187	142	.308	.098	.010	0.36	6.00	88.6	88.0	3.90	400	+	+	—
Watervliet	Tap, Sixteenth street	3/ 9/10	30	50	115	90	.062	.102	.001	0.10	2.50	60.0	51.0	6.00	14,000	+	—	—
Watervliet	Tap, Sixteenth street	6/17/10	10	25	148	108	.050	.140	.005	0.30	1.75	87.1	70.0	3.00	175	+	+	—
Watervliet	Tap, public supply	8/25/10	25	150	245	188	.008	.190	.001	.006	5.25	78.6	78.0	7.96	1,100	+	+	—
Watervliet	Tap, public supply	10/17/10	30	80	192	122	.012	.138	.002	0.24	4.75	94.3	93.0	9.40	250	+	+	—
Watervliet	Tap, public supply	12/ 9/10	20	20	205	159	.084	.106	.003	0.30	4.25	120.0	104.0	4.80	550	+	+	—
Watervliet	Tap, public supply, Roy's mills	12/27/10	30	15	202	102	.318	.280	.010	0.20	6.25	101.5	93.5	12.00	11,000	+	+	+
Watervliet	Tap, public supply	12/27/10													22,000	+	+	+
Watkins	Tap, public supply	2/ 3/10	Trace	Trace	227	206	.002	.052	.002	.04	55.00	122.8		1.69	1,000	—	—	—
Watkins	Tap, public supply	5/10/10	5	Clear	227	206	.006	.068	.001	.20	48.75	102.8	99.0	2.30	110	+	—	—
Watkins	Tap, public supply	6/ 8/10	3	None	225	191	.006	.072	.002	.14	53.00	100.0	95.0	3.00	44	—	—	—
Watkins	Tap, public supply	7/14/10	2	Clear	216	161	.004	.012	.001	0.10	50.00	111.4	94.0	0.70	2,300	—	—	—
Watkins	Tap, public supply	9/15/10	Trace	Trace	238	194	.018	.082	.002	0.24	53.75	97.2	94.0	0.90	200	+	—	—
Watkins	Tap, public supply	10/28/10	3	Clear	231	196	.030	.098	Trace	.20	54.00	88.6		0.20	60	+	—	—
Waverly	Tap, public supply	1/27/10	33	35	68	53	.018	.202	.007	0.40	1.62	26.0		5.90	88,000	+	+	+
Waverly	Tap, public supply	5/10/10	15	10	49	37	.014	.142	.003	.30	1.50	19.5	14.0	4.30	130	—	—	—
Waverly	Tap, public supply	7/13/10	10	Trace	51	33	.008	.084	.001	0.10	1.00	23.4	17.0	2.70	500	—	—	—
Waverly	Tap, public supply	9/15/10	12	1	69	39	.028	.240	.001	Trace	1.75	39.0	30.0	2.90	425	+	+	—
Waverly	Tap, public supply	11/ 2/10	12	10	74	54	.060	.134	Trace	.04	1.00	36.4	28.0	0.70	600	+	+	—
Waverly	Tap, public supply	12/ 8/10	10	3	68	46	.014	.148	Trace	.04	1.50	38.0	28.0	0.90	18	+	—	—
Wayland	Tap, public supply	5/30/10	Trace	Clear	153	123	.014	.032	.001	1.60	2.50	111.4	93.0	0.30	500	—	—	—
Wayland	Tap, public supply	7/18/10	Trace	Clear	160	121	.012	.022	.001	1.60	2.12	111.4	102.0	0.90	200	—	—	—
Wayland	Tap, public supply	9/17/10	Trace	Trace	168	136	.012	.040	.004	2.40	2.50	117.2	111.0	0.28	100	+	—	—
Webster	Rochester State Hospital well	7/23/10	5	7			.056	.114	.003	0.30	70.00			1.20	5,300	+	+	—
Webster	Rochester State Hospital well	8/ 2/10	Trace		852	530	.050	.108	.003	.30	66.00	364.5	307.0	2.50	1,200	+	+	—
Webster	Rochester State Hospital spring	9/10/10	8	3	210	163	.014	.124	.002	.80	2.75	160.0	153.0	.50	20,500	+	+	—
Webster	Tap, public supply	11/28/10	Trace	Clear	325	222	.026	.058	Trace	2.00	6.00	221.5	215.0	0.20	240	—	—	—
Weedsport	Tap, public supply	1/ 4/10	Trace	Trace	1,798	1,554	Trace	.012	.001	Trace		1107.6		0.15	2,100	+	—	—
Weedsport	Tap, public supply	3/ 8/10	3	1	615	557	.002	.012	.002	1.60		400.0		1.16	15	—	—	—
Weedsport	Tap, public supply	4/18/10	Trace	Clear	1,437	1,184	.002	.012	.001	.40		757.0		1.30	105	—	—	—
Weedsport	Tap, public supply	5/18/10	3	Clear	1,561	1,276	.002	.026	.002	.14		886.0	232.0	1.35	25	—	—	—
Weedsport	Tap, public supply	9/23/10	Trace	Clear	1,254	1,039	.008	.014	.002	.10	4.25	686.0	210.0	0.38	275	+	—	—
Weedsport	Tap, public supply	11/ 7/10	Trace	Clear	1,485	1,318	.008	.020	Trace	.04	4.75	886.0	227.0	0.10	50,000	+	+	—
Weedsport	Tap, public supply	12/ 7/10	Trace	Clear	687	617	.006	.032	Trace	.40	5.50	486.0	216.0	0.40	55	+	—	—

Analytical Results of Samples of Water — (*Continued*)

City, Town or Village	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Wellsburg	Tap, public supply	5/29/10	Trace	2	91	67	.010	.032	.002	0.30	2.87	57.1	54.0	.50	80	—	—	—	..
Wellsville	Tap, public supply	3/19/10	5	Trace	216	157	.076	.034	.004	0.40	7.50	135.8	126.0	0.90	90	—	—	—	..
Wellsville	Tap, public supply	5/31/10	Trace	2	91	67	.010	.032	.002	0.30	2.87	57.1	54.0	.50	80	—	—	—	..
Wellsville	Tap, public supply	10/6/10	10	Trace	171	131	.066	.070	.002	.24	6.75	100.0	98.0	0.10	40	+	—	—	..
Wellsville	River at intake	10/6/10	15	5	66	48	.014	.112	.002	.06	5.00	32.5	29.0	1.20	5,500	+	+	+	..
Wellsville	Tap, public supply	12/12/10	Trace	Trace	172	122	.044	.024	.002	0.30	7.00	117.2	116.0	1.00	20	—	—	—	..
Westfield	Tap, public supply	3/22/10	12	10	84	62	.006	.052	.002	0.60	0.75	57.1	32.0	1.80	6,600	+	—	—	..
Westfield	Kent reservoir	9/19/10	....	....	....	....	....	....	....	....	....	....	....	....	100	+	+	—	..
Westfield	Tap, public supply	9/19/10	2	5	201	145	.006	.092	.002	.02	1.75	128.6	128.0	0.33	5,800	+	...	—	..
Westfield	Tap, public supply	12/15/10	15	2	115	82	.012	.056	.002	0.40	1.00	72.9	67.0	2.20	500	+	+	+	..
West Haverstraw	Tap at New York State Hospital for Crippled Children, public supply	9/22/10	Trace	Clear	72	35	.002	.042	.001	0.16	2.75	33.8	32.0	0.67	600	+	+	+	..
Westport	Tap, public supply	3/2/10	Trace	Clear	80	56	.016	.018	.001	0.10	1.25	54.3	52.5	0.90	650	—	—	—	..
Westport	Tap, public supply	11/11/10	Trace	Trace	84	69	.008	.010	.002	0.10	0.50	64.3	62.0	0.70	70	+	—	—	..
West Winfield	Tap, public supply	11/19/10	Trace	Clear	246	210	.004	.054	.001	0.80	1.25	185.8	184.0	1.40	50	+	—	—	..
Whitehall	Tap, public supply	3/3/10	10	1	45	27	.002	.028	Trace	2.80	0.75	27.3	21.5	2.80	5,300	—	—	—	..
Whitehall	Long Pond, near outlet	6/15/10	10	1	45	24	.002	.094	.001	0.02	1.50	22.1	15.0	1.30	60	—	—	—	..
Whitehall	Tap in Hall House	6/15/10	....	....	....	....	....	....	....	....	....	....	....	....	450	+	—	—	..
Whitehall	Tap, public supply	11/10/10	1	5	100	78	.010	.056	.001	0.20	1.75	74.3	69.0	1.90	500	+	+	—	..
White Plains	Tap, public supply	1/12/10	10	12	66	50	.014	.100	.003	0.20	2.75	26.85	18.0	3.40	11,000	+	—	—	..
White Plains	Tap, public supply	7/27/10	15	30	71	48	.024	.118	.001	0.24	3.50	47.1	28.5	1.80	12,000	—	—	—	..
White Plains	Upper reservoir	8/2/10	7	10	29	19	.060	.134	.001	.02	2.75	18.2	3.5	1.40	600	—	—	—	..
White Plains	Lower reservoir	8/2/10	7	8	38	27	.016	.218	.001	Trace	3.25	23.4	6.5	2.50	600	—	—	—	..
White Plains	Well No. 5	8/2/10	7	Trace	245	213	.106	.064	.002	.24	3.50	145.8	142.0	.90	1,600	—	—	—	..
White Plains	Tap, public supply	8/2/10	8	15	74	52	.090	.100	.001	.22	3.62	44.3	26.0	1.40	100	—	—	—	..
White Plains	Tap at pump station	10/22/10	Trace	Trace	220	120	.012	.024	.006	0.30	3.75	114.2	111.0	0.30	700	+	—	—	..
White Plains	Reservoir No. 2	10/22/10	....	....	....	....	....	....	....	....	....	....	....	....	300	+	+	—	.
White Plains	Well No. 4	10/22/10	....	....	....	....	....	....	....	....	....	....	....	....	2,500	—	—	—	.
White Plains	Well No. 5	10/22/10	....	....	....	....	....	....	....	....	....	....	....	....	500	—	—	—	..
White Plains	Tap, public supply	11/29/10	15	10	102	74	.006	.054	.001	0.04	3.00	72.9	72.0	0.20	600	+	+	—	.
Whitesboro	Tap, West Canada supply	1/25/10	30	Trace	61	34	.034	.056	.002	0.40	0.50	33.8	31.0	4.30	300	+	—	—	..
Whitesboro	Tap, White's supply	1/25/10	15	3	169	131	.036	.050	.005	1.20	4.25	120.0	84.0	1.50	2,350	+	—	—	.
Whitesboro	Tap West Canada supply	4/7/10	20	1	40	20	.008	.088	Trace	0.40	0.25	15.6	10.5	5.50	70	—	—	—	..

Whitesboro	Tap, White's supply	4/ 7/10	Trace	5	200	155	.006	.034	Trace	1.60	4.87	148.6	140.0	1.80	100	—	—	—
Whitesboro	Tap, West Canada supply	6/21/10	10	1	49	26	.020	.074	.001	0.04	0.50	15.6	13.0	6.00	360	—	—	—
Whitesboro	Tap, White's supply	6/21/10	5	35	212	135	.002	.082	.004	0.40	4.75	134.2	132.0	2.60	700	+	+	—
Whitesboro	Tap, West Canada supply	9/23/10	35	2	57	32	.004	.078	.001	.20	0.50	29.9	20.0	5.37	50	+	—	—
Whitesboro	Tap, White's supply	9/23/10	Trace	Trace	219	163	.012	.058	.001	1.12	4.75	151.4	151.0	0.95	200	+	—	—
Whitesboro	Tap, West Canada supply	11/16/10	30	Trace	64	49	.004	.088	.001	0.20	.50	19.5	16.0	6.10	220	+	—	—
Whitesboro	Tap, White's supply	11/16/10	5	2	200	144	.008	.158	.003	1.44	4.50	142.8	140.0	1.10	160	+	+	—
Whitney's Point	Tap, public supply	7/21/10	Trace	Clear	80	61	.014	.026	.001	0.30	0.25	54.3	53.5	0.20	900	—	—	—
Whitney's Point	Tap, public supply	12/29/10	Trace	Clear	101	85	.006	.012	Trace	0.52	1.00	74.3	73.0	0.60	13	—	—	—
Williard State Hospital	Tap, hospital supply	9/14/10	Trace	Clear	233	201	.002	.070	.008	.20	51.75	97.2	91.0	1.00	60	+	+	—
Williamsville	Tap, public supply	3/ 3/10	5	Trace	525	430	.002	.006	.003	0.80	11.50		142.0	1.00	700	—	—	—
Williamsville	Tap, public supply	6/22/10	5	Trace	589	471	.004	.034	.002	0.20	12.00	464.5	150.0	1.00	275	+	—	—
Williamsville	Tap, public supply	10/14/10	12	3	929	779	.004	.032	.002	0.02	19.75	600.0	168.0	0.90	40	+	+	—
Wolcott	Public well	4/ 8/10													7,350	+	+	+
Worcester	Tap, public supply	7/23/10	Trace	Trace	31	23	.008	.052	.001	Trace	.625	23.4	3.0	1.50	450	—	—	—
Wyoming	Tap, public supply	3/17/10	3	Clear	212	177	.002	.002	.001	1.00	0.50	162.8	143.0	0.50	100	—	—	—
Yonkers	Raw water, Nepperhan river	1/11/10													14,500	+	+	+
Yonkers	Grassy Sprain supply	1/11/10	20	5	84	57	.030	.098	.005	0.10	4.37	45.7	36.0		2,100	+	—	—
Yonkers	Effluent filter, unit No. 3	1/11/10													3,200	+	—	—
Yonkers	Effluent filter, unit No. 4	1/11/10													4,800	+	+	—
Yonkers	Mixed effluents, Nos. 3 and 4	1/11/10	15	5	132	85	.110	.094	.005	0.60	5.00	52.9	35.0	3.30				
Yonkers	Raw water	8/ 3/10	5	12	155	121	.016	.134	.004	0.20	6.50	120.0	89.0	1.90	25,000	+	+	—
Yonkers	Filter No. 4, filtered and chlorinated	8/ 3/10									6.50				1,500	+	+	—
Yonkers	Raw water	10/ 6/10	30	5	123	78	.100	.226	.006	0.04	5.50	77.1	76.0	4.00	7,400	+	+	+
Yonkers	Effluent filter, unit No. 1	10/ 6/10													700	+	+	+
Yonkers	Effluent filter, unit No. 2	10/ 6/10													650	+	+	+
Yonkers	Effluent filter, unit No. 3	10/ 6/10	5	Trace	125	89	.018	.096	.003	.240	6.50	88.6	88.0	1.86	375	+	+	+
Yonkers	Effluent filter, unit No. 4	10/ 6/10													700	+	+	+
Yonkers	Sawmill river at intake—some Croton water	11/28/10													2,100	+	+	+
Yonkers	Mixed effluents of all filters	11/28/10	5	Clear	141	104	.006	.042	.003	0.50	6.75	98.6	89.0	1.20	150	+	+	—
Yonkers	Effluent chamber, filter No. 4	11/28/10													280	+	+	+
Yonkers	Tap, Grassy Sprain pump station	11/28/10	25	15	102	70	.510	.154	.012	0.30	4.50	60.0	49.0	2.00	3,200	+	+	—
Yorktown Heights	Mohansic State Hospital, Mohansic Lake	9/27/10	30	5	69	34	.086	.374	Trace	.02	2.50	32.5	32.0	4.81	330	+	+	—

In co-operation with the Engineering Division a special investigation of the sanitary quality of the water of the St. Lawrence river at Cape Vincent and Clayton has been made and elsewhere reported.

The work of Group C — diagnostic examinations for the detection of infectious disease and control of quarantine — has been carried out by this laboratory for its first full year.

Laboratory Diagnostic Work for 1910

MONTH	CULTURES FOR DIPHTHERIA DIAGNOSIS								
	POSITIVE			NEGATIVE			TOTAL		
	1908	1909	1910	1908	1909	1910	1908	1909	1910
January	50	120	284	61	150	282	124	303	566
February	87	83	253	82	54	389	178	153	642
March	84	30	231	68	40	331	158	74	562
April	60	59	178	44	35	439	110	110	617
May	58	32	171	23	52	581	87	129	252
June	32	54	100	35	69	326	71	143	426
July	31	49	61	45	55	394	79	121	455
August	32	26	88	27	81	472	66	121	560
September	61	34	77	53	68	541	123	122	618
October	52	24	107	45	68	266	109	100	373
November	85	101	124	129	169	222	227	281	346
December	109	143	148	123	173	337	265	314	485
Total	741	755	1,822	735	1,024	4,580	1,597	1,971	6,402

Laboratory Diagnostic Work for 1910 — (Continued)

MONTH	SPUTUM EXAMINATIONS								
	POSITIVE			NEGATIVE			TOTAL		
	1908	1909	1910	1908	1909	1910	1908	1909	1910
January	14	51	48	40	92	94	54	143	142
February	23	44	43	40	101	110	63	145	153
March	29	58	76	40	85	150	71	133	226
April	28	44	61	47	69	162	75	115	223
May	33	45	53	42	120	121	76	165	174
June	35	39	38	45	115	89	80	156	127
July	31	33	36	37	135	79	68	168	115
August	28	60	56	42	113	80	70	173	136
September	31	32	37	61	110	71	93	142	108
October	55	39	48	27	115	98	82	154	146
November	7	36	42	9	89	99	18	126	141
December	15	45	46	68	101	124	92	146	170
Total	339	526	584	498	1,245	1,277	842	1,766	1,861

Laboratory Diagnostic Work for 1910 — (Concluded)

MONTH	WIDAL TEST FOR TYPHOID FEVER								
	POSITIVE			NEGATIVE			TOTAL		
	1908	1909	1910	1908	1909	1910	1908	1909	1910
January	4	12	17	8	15	26	18	34	43
February	7	25	28	14	24	21	24	77	49
March	5	18	21	13	18	21	24	63	42
April	....	10	6	6	9	22	7	30	28
May	8	....	8	11	15	13	21	17	21
June	6	2	9	16	12	15	25	14	34
July	11	1	32	15	10	46	35	11	78
August	29	1	23	33	8	41	84	9	64
September	19	3	26	61	18	46	88	22	72
October	16	....	29	41	18	38	63	18	67
November	26	5	38	48	16	62	76	24	100
December	16	15	17	16	16	27	34	39	44
Total	147	92	254	282	179	378	499	358	632

The special investigations of the mineral waters of Saratoga have been continued by the Laboratory Division and reported to the Saratoga Reservation Commission.

ALBANY, N. Y., *September* 22, 1910.

HON. EUGENE H. PORTER, A.M., M.D., *State Commissioner of Health, Albany, N. Y.*

SIR:— Complying with your instructions to report to you further details and conclusions of the Laboratory Division in regard to the investigation of the mineral waters of Saratoga; referring to the preliminary report already in your hands, I submit the following matter with the understanding that it is intended only for assistance of various parties concerned in their actual efforts to determine more precisely the situation and value of some of these springs.

In the preliminary report, the waters of the springs of Saratoga were presented as of three kinds; the saline alkaline waters, of which the principal mineral ingredients from the point of view of quantity, are chlorine of sodium and bicarbonates of calcium and magnesium.

In all of the waters of this group the relative quantity of various salts contained may vary, but in so far as the investigations of the laboratory have gone, it is apparent that any characteristic mineral matter found in one of the spring waters of the group is also to be found in every other spring water of that basin.

The amount of total mineral substances contained in the waters of the various springs, *i. e.,* the mineralization factor of each spring water varies very decidedly and in consequence of this variation of the quantity of mineralization is the different therapeutic action established in all probability; that is to say, the difference in the action of various of these spring waters upon the human organism is more rationally due to the different quantity of mineral matter in the respective waters considered, more than to a particular salt or substance existing in any specific water.

The meaning of the previous statements is that the various saline alkaline waters of Saratoga differ from each other for all practical purposes merely in the degree of concentration of their mineral substances.

The most highly mineralized waters of this class, such as the Carlsbad and Hathorn, show a relatively strong purgative or cathartic and diarrhetic action upon the human organism, whereas the less highly mineralized water becomes of relatively slight immediate therapeutic effect, but is valuable as a pleasant table water.

The majority of the mineral waters of Saratoga belong to this saline alkaline class.

A few of the springs are reputed to supply Chalybeate waters. The investigations of the laboratory to this point would indicate that these waters contained relatively the same mineral substances as those of the saline alkaline group, but a somewhat increased quantity of iron.

Such iron exists in this water as the ferrous bicarbonate; the access of air to a water containing this salt of iron results in the oxidation of this iron to an unstaple compound, the consequent precipitation of which causes clouding of the water. Such a water as ordinarily bottled, undergoing this change of oxidation, does not present a pleasant appearance and the exploita-

tion of such bottled water is practically not undertaken on this account. Such waters have been for the most part utilized merely for drinking upon the premises; as a type of these are the waters of the Columbian and Clarendon Springs.

A number of waters grouped as saline alkaline also contain this ferrous bicarbonate in sufficient quantity as to render the maintenance of its clear condition when bottled very difficult, a slow oxidation of the iron salt generally resulting in the production of a yellow iron compound, causing a dirty and disagreeable sedimentation. The bottling of such waters containing considerable iron, has been successfully accomplished by a special bottling machine, closing the bottle with the exclusion of all air and thus assuring the maintenance of a clear content. Such method is followed at the Hathorn Spring.

A second method of maintaining a clear fluid in the bottle consists in adding a small amount of tartaric or citric acid to the spring water, which successfully maintains a clear solution of the iron compound.

The exploitation of the Congress Spring waters acknowledges this procedure and a statement to that effect is found on the labels of their bottles distributed outside of Saratoga.

A third method used to avoid a subsequent oxidation and sedimentation of iron compounds in such water consists in aerating the water before bottling it, thus bringing about the oxidation of this unstaple iron compound, its immediate precipitation and removal from the water by filtration. The Lincoln Spring uses this method to obtain a water that will remain clear when bottled.

A third group of waters found at Saratoga is made up of the so-called sulphur water. The so-called sulphur spring at the Eureka baths is not highly mineralized, but is to some extent impregnated with hydrogen sulphide. This is the only water of this class known in Saratoga by the Department.

In considering the value of those different mineral springs as commercial assets, besides the material condition and equipment connected with each spring, the extent and organization of its business, there are a number of factors demanding important consideration which depend upon the spring itself.

Foremost among such factors is the question of the relative mineralization of the waters; that is to say, the quantity and nature of mineral substances dissolved in each water. The second consequence of this first factor consists in the amount of such water that is obtainable daily from a given spring without affecting the permanent mineralization value of its water; that is to say, the total volume of the daily flow of each spring showing a constant mineral content and no trace of exhaustion of the underlying mineral water vein.

A third and all important factor is the sanitary quality of such water intended for human consumption.

In the preliminary report to you it was shown to what extent the bacteriological investigations of some of these waters showed them to contain fecal organisms, subject to further investigation and control. A permanent content of such fecal organisms would of course indicate that such waters were unsafe for consumption and consequently such permanent contamination would totally abolish any commercial value that otherwise might be assigned to such waters.

The problem of determining any possible value in the presence of these actual investigations showing the existence of fecal organisms, involves a study of surroundings and repeated controls.

It can be said now that the presence of these fecal organisms in the waters so reported to you would indicate a quite direct infiltration of surface or close underlying surface water with that of the springs concerned. This connection being once so made, may persist and constitute a permanent condition beyond relief, or it may be that a cessation of pumping or other drainage of large volumes of water and stop to this extent the depletion of the spring water basins and that consequent changes in such basins, may immediately again exclude the infiltration of this undesirable water of surface source and in such a case it would be perfectly possible that such springs could then regain a water of satisfactory sanitary quality.

The preceding paragraphs indicate more or less natural deterioration of such spring waters, but further than that a deterioration directly caused by human intervention is perhaps of as wide or even more disastrous effect.

It is persistently rumored that falsification of the natural water product of numbers of the Saratoga Springs is very prevalent in the exploitation of Saratoga mineral waters. The investigation of your Department has secured evidence that in some cases these rumors are well founded. It is not difficult to find incentive for such falsifications and imitations in the mineral water basins under the conditions at present prevailing in Saratoga.

Three inducements for such fraudulent action are immediately apparent:

First, falsification might be reported to cover up, and to this extent, remedy a deterioration of the degree of mineralization of the water of some of these springs.

Second, the development and distribution to the public of a spring water of established reputation might extend beyond the actual water capacity of the spring, the name of which was a valuable asset in this business; and to meet a distribution greater than the actual production, falsification by the use of other water might be undertaken.

A third inducement to fraud might be found more or less in the partial or complete failure of a given spring to supply its water after a business had been developed in its name which had heretofore been supplied with a perfectly reliable product.

The investigations of your Department and minute examination of various establishments bottling mineral water at Saratoga have discovered in a number of establishments an arrangement of pipe systems, tanks, pumping machinery, etc., which make it very possible to introduce water from a source other than that of the true mineral spring into tanks in the establishment from which the water for bottling is taken.

Various chemical substances and the necessary apparatus for dissolving and introducing solutions thereof into the above-mentioned tanks, have been found practically in position that would indicate such use.

It is vitally necessary in determining a commercial value of a given spring to determine whether or not any falsification has ever been practiced in connection with the exploitation of its waters; for in the estimate of such commercial value the good will, name and trade labels which might be of great value if

strictly honest, would be totally valueless for any State control of the water, the reputation of which had been established in any way by fraudulent practice.

Furthermore, if the addition of chemicals should be necessary to maintain the iron in solution, and this fact had heretofore been concealed, the necessary public acknowledgment that a State control would require, might reduce the volume of business to a considerable extent and be an important factor in determining the future value of such a spring water.

It might, on the contrary, be desirable to market such an iron containing water without the introduction of a chemical solvent and such procedure would necessitate the introduction of a special method of bottling, with the exclusion of air. The change and new machinery and methods thus involved might greatly increase the cost of placing this water on the market and to this extent would effect the determination of the value of such water.

Suppose, however, the removal of a subsequently precipitated iron from a water were undertaken by its aeration and filtration, this practically should be publicly acknowledged under any State control and such acknowledgment might involve a considerable loss of business in a water that had been exploited without the admission of these truths.

A number of springs exploited at Saratoga would apparently have great difficulty in maintaining their reputation after a careful investigation of facts. For instance, there is a pavilion in Saratoga in which are located three healing springs; one of which is declared to be a producer of an iron water, the second, of a magnesia water; and the third of a lithia water. There are three wooden tubes in the pavilion supposedly connected with such springs, but at the time of the investigation made by the Department, your inspector using for five minutes a hand pitcher pump, had exhausted the flow of all three of the springs. There remained no doubt that the three tubes were undoubtedly fed from one common source and that the water flowing from each one of them was the same.

The location of a spring, its general and widely established reputation and the extent to which its water is advertised are

widely important factors in determining the value of individual springs.

At the present time in Saratoga there are existent springs, the material conditions and mineral properties of which are far in excess of their exploitation. In fact, there are springs in Saratoga and its vicinity that in quality of mineralization and volume of flow are worthy of consideration as among the best springs of that district, but the waters of which are little known to the public and the exploitation and business developments of which waters are of very small degree.

The progress of your investigation of these mineral waters is sufficient to show that although it cannot be said that the mineral content of the waters of many of these springs exactly duplicate the water of another, nevertheless there are a number of these springs, the general character of the waters of which is so similar that the use of any one of these waters would fill all proper and therapeutic requirements of a successful exploitation. It would undoubtedly be beneficial to select one or more of these springs for its better location, sanitary character or other greater desirability and utilize the waters of this spring for general exploitation and advertisement to the exclusion of many of the other less desirable springs supplying the water of practically the same nature.

There is appended herewith a table showing the amounts of the more important chemical substances found in a number of these spring waters, (A) as reported in Bulletin No. 91 "Mineral waters of the United States," by the United States Department of Agriculture in 1905, and just below each of these quantities in line (B) the results found by analysis of waters taken from these same springs in the winter of 1909 to 1910, during the investigations of your Department and analyzed by your order at the State Hygienic Laboratory. The quantities in this table state the number of milligrams per liter.

The comparison of these two series of analyses at an interval of five years shows very strikingly a very material reduction in the mineralization of these waters.

The knowledge possessed by your technical staff on conditions and operations at present existing in Saratoga renders the observed lessened mineralization of these waters, a confirmation of

the resultants to be expected from the present condition of the mineral basin of Saratoga as we know it.

A number of illustrations or exploitations in this resultant from the investigations of your inspectors at Saratoga are appended to this report to you.

Yours very respectfully,

WILLIAM S. MAGILL

LEONARD M. WACHTER

	Silica	Sulphates	Chlorine	Calcium	Magnisium	Oxide, iron, Aluminium	Sodium	Potassium	Lithium	
High Rock	33.4	15.7	483.3	223.0	60.6	17.5	348.0	34.3,	8)	A
	5.02	19.8	109.30	......	14.55	Trace	71.50	11.34	Trace	B
Magnetic	42.7	2.3	1,313.4	326.4	122.8	80.0	849.7	56.9	3.2	A
	53.93	1.89	811.98	138.41	91.82	18.8	....	......	....	B
Carlsbad	13.5	2.8	4,419.6	628.6	298.8	18.8	3,014.5	237.8	5.3	A
	8.60	Trace	3,914.16	691.89	281.78	10.83	2,732.00	288.18	10.5)	B
Hathorn	19.6	5.6	3,685.5	650.7	228.8	14.0	2,430.7	197.2	0.5	A
	11.03	9.3	1,759.29	510.87	139.27	33.66	1,284.5	124.96	......	B
Lincoln	32.7	3.5	4,068.0	675.8	325.9	19.8	2,688.0	243.7	1.8	A
	13.16	2.18	1,290.84	156 76	79.12	36.16	1,320.82	178.25	Trace	B

A — The numerals of lines marked "A" are the corresponding analytical data of the United States Department of Agricultural Reports.
B — The numerals of lines marked "B" are the corresponding analytical data of the New York State Department of Health Reports.

ALBANY, N. Y., *May* 27, 1910.

HON. EUGENE H. PORTER, A.M., M.D., *State Commissioner of Health, Albany, N. Y.*:

SIR:— Under date of May 21st, the attention of your Department was called to the washing of vegetables by truck gardeners in the water of the Erie canal, between Troy and Albany. This complaint was received by you on May 23d and transmitted to Inspector Number ——, with your instructions to investigate that matter on the following day.

Your inspector called upon the gentleman making this complaint, but was unable to find him at home. He accordingly proceeded to the direct investigation of the subject-matter.

He found that it is a constant practice and has been for some

time for a number of truck gardeners to wash vegetables in the water of the Erie canal at various places, which vegetables they subsequently supply to the markets of Troy and Albany.

In particular at a point in the canal near Schuyler bridge, spinach was seen by your inspector to be washed and his investigation showed that this spinach was the property of a Mr. Beattie, who had built a wooden rack pen in the canal, into which pen vegetables to be washed were thrown from a wagon with forks; and after remaining in this pen, submerged with water, were taken out with the forks and thrown upon the bank to drain. They were subsequently loaded on to wagons, which wagons as a matter of custom usually left his residence from two to three in the morning to arrive at the Troy market at an early hour the following day.

At the time of this inspection a number of boys were in swimming at this place and samples of the water of the canal were taken at this time for examination at the laboratory.

In this vicinity also another pen, in which spinach, lettuce and onions were washed, was found existing in the canal, stated to be the property of O'Leary, a truck gardener who conveyed the most of his produce to Troy and also to the Albany market.

Another installation of the same sort served for the washing of products, the property of a man named Keys, who sold this produce at Troy.

At another point a similar installation belonging to Mr. O'Brien, was found; he washed practically all of his green produce in this way; at the time he was washing spinach, lettuce and onions and he sold all of this produce both in Troy and Albany.

Another installation was visited belonging to a Mr. Mattimore, where the actual washing of thirteen barrels of spinach, three of lettuce and a quantity of onions were seen and the two sons of this proprietor were interrogated. They stated it to be the usual custom to wash green produce here in this way; that after the produce remained in the water for some half hour or more, it was removed therefrom with forks, allowed to drain on the banks, subsequently loaded on to wagons and driven to the barn. From this barn the wagons started about two or three o'clock in the morning to arrive at the market at an early hour and sell the produce.

Another installation for washing the produce of Mr. T. Smith was also found, where spinach and lettuce were washed, which produce it was stated was carted early the following morning for sale at the Troy market.

Another installation opposite the farm of Mr. Clancy was said to be used by Mr. J. Mullen of Island Park, for washing of his green produce and a further installation was found of this nature, utilized by Mr. Burns.

Nearer to Albany, in the rear of Altro Park, a Mr. Burns was found to have a similar wash stand; and a Mr. Sheller and Mr. Carmend, vendors of such products, were found in this vicinity, but these last two were not provided with wash stands. The last three mentioned bring their truck for sale in Albany.

This method of washing green produce has been known for a long time by the people dwelling in that vicinity and is easily observed by passengers in the car line running between Troy and Albany and has been so observed in actual operation by members of the Laboratory Staff.

A report of the actual nature of the water in this Erie canal at the time of the washing is appended.

Respectfully submitted,

WILLIAM S. MAGILL
WILLIAM A. BING

Appendix Number 1

ALBANY, N. Y., *May* 27, 1910.

Four samples of water from the Erie canal were taken and designated as follows:

Alta Hotel	Sample number 3358
Key's Farm	Sample number 3357
Schuyler Bridge	Sample number 3355
O'Leary	Sample number 3356

The designations used for these samples denote the places in the canal at which the water was taken, at each of which places green products for market were washed. The samples were collected between three and four p. m. of May 24th and were plated before 6:30 of the same afternoon. The laboratory examination reports as follows:

Sample No.	
3358	Bacteria per c. c., 3,700; B. coli type present in 1/10 c. c.
3357	Bacteria per c. c., 4,100; B. coli type present in 1/10 c. c.
3355	Bacteria per c. c., 1,500; B. coli type present in 1/10 c. c.
3356	Bacteria per c. c., 800; B. coli type present in 1/10 c. c.

The water of this canal is that of the Mohawk river, the water of the last level of the Champlain canal and of at least one small stream which enters the canal at a point north of the Arch Street bridge, which crosses the State basin at Green Island.

In addition to the usual polluted condition of Mohawk river water, there is evident pollution occurring along the canal at the points covered by your inspection. For the general dangerous nature of such water and particularly that of the Mohawk river, reference is made to the laboratory reports of previous years of the water of this river and of these districts.

ALBANY, N. Y., *October* 4, 1910.

Hon. E. H. PORTER, A.M., M.D., *State Commissioner of Health, Albany, N. Y.:*

SIR:— The undersigned has received copies of correspondence with the president of the State Commission in Lunacy, under date of June 28th and July 21st, with the replies of this Department of June 30th and July 27th, a letter of this Department to the superintendent of the Gowanda State Hospital, dated July 27th, a reply of that superintendent dated July 29th and the acknowledgment of that reply, made by this Department on August 2d.

The correspondence has to do with the damage of clothing and

similar material treated at the Gowanda State Hospital for disinfection for a scarlet fever epidemic, by immersing this material in a bath made up of a solution of bichloride of mercury one part to 500 parts water, and a constant damage of this material is reported from that hospital.

Complying with your order, the Division of Laboratories has investigated this matter and it is herewith submitted. The common name of bichloride of mercury is that of "corrosive sublimate" and this name signifies the particular corroding nature of this substance, which property is very marked, even in its most dilute solutions.

It is well established that a solution of the strength heretofore specified of this chemical compound is quite destructive to fabric and as illustration of this general knowledge, reference is made to a book on "Disinfection and Disinfectants," by S. Rideal, edition of 1895, page 138, where referring to the use of such a solution for disinfection of railway carriages, the following sentence occurs: "It is to be noted that mercuric chloride solution, especially if acidified, would rapidly injure the cushions or hangings."

It is well known that such a solution should not be used for fabric if damage is to be avoided and for this reason the disinfection of all clothing, curtains and such material for which steam disinfection or washing is unavailable is resorted to by formalin gas or sulphur dioxide.

Your attention is respectfully called to paragraph No. 3 on the second page of the circular issued by this Department, entitled, "Disinfection and Disinfectants," where the use of such a solution for disinfection of clothing is distinctly recommended.

Apparently such recommendation should not have been made, or if made should have been accompanied by a special caution that a very decided damage to any fabric would result from such treatment.

Respectfully submitted,

WILLIAM S. MAGILL,
Director of Laboratories

ALBANY, N. Y., *October* 11, 1910.

HON. EUGENE H. PORTER, A.M., M.D., *State Commissioner of Health, Albany, N. Y.:*

SIR:— Complying with your order of October 5th, the undersigned inspector has received the Department file with the correspondence matters pertaining to health conditions at Rouses Point and has visited that place on October 6th and investigated the question of the existence of typhoid fever in that village at the present time; and in further compliance with your general order, has investigated the general health conditions and the attitude of the various public boards of the village, upon whom responsibility for health conditions should rest, and the steps that have been taken by any such board for improving the conditions since March of this year, and the reasons why steps for the betterment of health conditions have or have not been taken.

The immediate determinant of the order for the present investigation appears in two letters, both dated September 29th, written from Rouses Point and herewith submitted as appendix "A." The information of these letters states that a number of cases of typhoid fever actually exists at Rouses Point; that a scandalous pollution of water used for the public supply is known to exist; that at least one physician is suppressing all knowledge of typhoid cases and endeavoring to conceal such from the local health board and that the village board of trustees are doing nothing to relieve the known polluted condition of the water supply; that they are not acting in any way to aid the local health board in improving conditions; that at least two deaths have very recently occurred from typhoid fever; that with the exception of cases reported by the health officer, no cases are reported by any other attending physician at the present time; and the charge is made that an effort to conceal any knowledge is being made.

Complying with your order of October 5th, Dr. W. C. Thompson, medical officer of this Department for that district, was notified to meet the undersigned inspector at Rouses Point early on the morning of October 5th and this medical officer accompanied said inspector in the principal investigations of the health conditions of the locality during his interviews with every practicing

physician at Rouses Point and the official interviews of the inspector with the health officer, the first meeting of the local board of health and the joint meeting of the local board of health, members of the village board of trustees, including the president, a member of the water board of Rouses Point and one or more influential citizens, including the largest property holder of that village.

It is recalled that health conditions at Rouses Point have been unsatisfactory to this Department for more than a year; that last winter for a period of several months a decided infection of typhoid fever existed in that community.

The records of the Department show that the laboratory reports on the condition of the water supply of that village indicate that the water taken from Lake Champlain at that point is of such unsanitary quality as to be dangerous for use in its raw condition.

Because of the unsanitary conditions of that community, an extended investigation of these conditions was made by your Department and a report embodying the results thereof, was made to you by the Chief Engineer of this Department under date of March 2, 1910. A copy of this report was forwarded by you to a suitable official of Rouses Point under date of March 18th.

Your report included recommendations, very insistently stated, requiring the immediate action of the local authorities to protect the health of the citizens of that community and to take further action to assure a safe water supply in the future for that community.

I beg to refer you to a copy of your report here attached as appendix "B" and specifically to the recommendations for the action of the local authority on pages 12 to 15 of that report.

The Department file shows some correspondence with the village president and with the health officer of Rouses Point since that time and shows also a report of the consulting engineer employed by that locality for the subject of improvement in the water supply, and shows under date of July 14th a communication from the president of the village to you, stating that a proposition to raise funds to build a slow sand filtration plant — according to the recommendations of the consulting engineer — was submitted to vote of town and lost.

It is evident from the file and established by investigation of the undersigned inspector that since last spring not a single step has been taken to improve the sanitary condition of the water supply, to abate the sewage pollution of that water, nor to warn the citizens to any further degree of the danger of using such water, nor in any way to protect the health of the citizens from the constant menace of the admittedly unsafe water of the public supply.

Your inspector has found that no notice has been issued to the citizens concerning the insanitary condition of the water since last May, when a notice (copy attached as appendix "C") was issued and various faucets of the public supply in school buildings and other exposed public places, were closed by the health officer.

It has been stated to your inspector and corroborated by more than one witness, that prominent members of the village board of trustees, or of the water board, have openly and repeatedly stated since that time that the water was in satisfactory sanitary condition; that there was no harm to be feared from the use of the water; and that investigations made by a private individual, stating the results of laboratory analyses, showed the water to be quite harmless.

Furthermore, it was stated and proved that in spite of the closing of various faucets of the public supply by the health officer, in particular in public schools, that these faucets had been, without authority of the health officer, reopened and that the water was actually in daily use in these schools and it was apparent and admitted at the joint meeting attended by your inspector, that the use of this water and that the opening of the faucets distributing this water without authorization of the health officer and contrary to his repeated insistence that they must be maintained closed, was well known to the principal member of the water board, to the President at least, of the village board of trustees of Rouses Point.

Your inspector noted that residences of Rouses Point along the shore of the lake, most closely adjacent to the point of intake of the public water supply; residences extending for a half a mile or more along this lake front and all within the breakwater, constituting a sort of bay, within which public supply is taken; that all of these residences practically discharge their entire sewage directly into the water at the edge of the lake; that in some cases the dis-

charge of such drain pipe was not even under water and that in relatively every case the drain pipe did not go further than a point of constant submersion.

It was pointed out to your inspector that a number of these residences, complying with the advice of the health officer, were constructing cesspools, into which the house drain would flow directly and of which the overflow alone would flow into the lake and it was the contention of the health officer that wherever these cesspools were constructed (directly on the shore of the lake) he would see to it that they were properly and thoroughly cleaned at suitable times.

It was further noted by your inspector that practically all of the houses not directly upon the lake front, but upon streets further back paralleling the lake shore, were unsupplied with any public sewer; that there was a considerable number of such houses extending for several blocks back from the lake front and for a distance of perhaps half a mile where all of the house drainage discharged directly into open ditches, which ran to open ditches on the side of the street and that these open ditches conducted all of this waste directly into the lake at the point of abutting of cross streets upon the lake shore. In a number of cases it was observed there were for considerable distances, stagnant pools of such house drainage, containing putrefying material and giving off offensive odor.

Practically without exception, the privies of every one of these houses were little outhouses a short distance back of each house, built from the surface of the ground, or in some cases perhaps, into a slight excavation about one foot in depth.

As a general rule, however, all of the excreta lay upon the surface, in a large number of cases directly accessible to insects of any kind and where surface wash would carry it with slight resistance or retardation directly into the open ditches utilized for the house drainage.

Such material, therefore, would also be poured very directly into the lake water.

A number of houses were observed by your inspector, in which there was absolutely no provision of privy, where the human excreta must of necessity be deposited quite miscellaneously over the surface of the dooryards, either before or behind the house,

and a number of such houses showed a considerable accumulation of waste, garbage and similar material in close proximity to the house.

Report of this Department previously alluded to and attached as appendix " B," describes very completely the actual inlet of the public water supply.

It was stated to your inspector, but not verified by him, that the intake is actually not so far from the shore as is indicated in that report.

The conditions of wind and current indicated in that report, which so facilitate the arrival of sewage at the intake of the water supply, were very manifest at the time of the visit of your inspector.

It was stated to your inspector and a map was shown to him, of an original proposal for the establishment of sewers at Rouses Point and that the sewage system indicated by that map was at one time approved by this Department.

Whatever the case may be, it was evident that all of the discharge of sewage from residences on the lake shore and back of, but parallel to these residences, into the lake was illegal. It was also evident that there was no legal authority for the existing sewage system, the construction of which is very widely different from the map shown your inspector as having been the design of the original sewer system, for which authority was at one time obtained.

Your inspector called upon every practicing physician in Rouses Point, three in number. He found, and the statements were apparently verified, that one physician had no cases of typhoid fever in his practice and had had none for a long time. This physician was not engaged in active practice. Another physician, not the health officer, who has been previously found at fault by your Department for not notifying the Department nor the health officer of cases of contagious disease and who was at this time directly accused in the correspondence referred to previously and attached as appendix "A" as concealing cases of typhoid fever actually existing or having existed within the last few weeks, was interviewed by your inspector with the assistance of the medical officer designated, and this physician admitted that

he had actually two cases of typhoid fever in his practice and that a short time previously a patient under his care had died of typhoid fever.

It was also stated by other parties that a second death in the practice of this physician had recently occurred from typhoid fever, but this case was not mentioned by the physician when interrogated.

The physician in question admitted that he had not reported any of these cases to the health officer, nor to the Department. He stated that he would do so as soon as he received proper cards for such reports and he stated that his excuse for not doing so before was that he did not have such cards.

In this connection it was stated to your inspector by the health officer and corroborated by his secretary, that he had at frequent intervals mailed to the physician now at fault for not reporting his cases, suitable report cards and that not less than ten days previous to the visit of your inspector a quantity of cards suitable for the reporting of typhoid fever, had been mailed by the health officer to the physician specified, and furthermore, it was stated to your inspector by the secretary of the local board of health that he had personally called upon this physician a number of times, requesting him to report all of the proper cases promptly to the health officer and that he had personally handed to him such request in writing; that he had a copy of this written request in his files and that at the time of handing such request he had also handed to the physician the suitable report blanks.

It is evident from the file of this Department, from the statements and corroborated statements of members of the local board of health and the health officer, that the physician specified has been unusually well informed of his duty to make prompt reports of the various matter of vital statistics and of contagious diseases required by this Department; that this physician has been unusually well, frequently and amply supplied with the necessary report blanks and that he has, with scarce an exception, and then only as a last resort, made any suitable report of the matters required by him.

It is evident by investigation of this Inspector that the same physician has repeatedly had cases of typhoid fever in that com-

munity; that there were actually cases in his care at the time of the visit of the inspector that were unreported and furthermore, in which it was evident that active effort had been made to prevent the health officer from having due knowledge of the existence of this disease and that these conditions and actions of the said physician had existed for some time and had been maintained even when at least one patient had died from typhoid fever, the knowledge of which said physician admitted to your inspector and corroborated statements were made to your inspector concerning this specific case and of other cases in general; that in such case, under the care of the physician above alluded to, not a single precaution had been taken for the disinfection of the excreta from such patients or to prevent contact infection of the neighborhood.

Statements were made and corroborated that excreta from such case under the care of this physician, were known to have been thrown out in the yard of the house, without any effort at burial or disinfection being made at all and that protests made by neighbors relative to this carelessness were met by the statements of the house members where this case existed that the physician declared it was not typhoid fever and precautions were not necessary.

Your inspector ascertained by inquiry from a number of citizens of the community, that the physician in question never supplied circulars issued by this Department, setting forth the precautions to take for various contagious diseases and that he practically never notified the health officer of the existence of such diseases, apparently doing all in his power to prevent knowledge of the existence of such disease from coming to the health officer and taking any active measures to control such infection.

Your inspector feels that in this investigation it is necessary to state before you the results of an investigation on a broader basis than the mere determination of material conditions.

Unsatisfactory as the sanitary conditions of this community evidently are, as they are set forth in the report of your Department previously alluded to and attached as appendix "C," unsatisfactory as they are found to be by this present investigation of your inspector, it is evident that there exists at Rouses Point an unhealthy condition far more disastrous than any of the material conditions heretofore set forth.

There exists an unhealthy psychological condition in that community, which requires severe and radical therapeutic measures to bring about a tenable condition for the development of a healthy community.

Your inspector found an energetic, earnest health officer, awake to the danger of the water supply, perhaps not sufficiently awake to some other unsatisfactory material conditions, but eager to do his full duty. He found acting in full endorsement and co-operation with their health officer the members of the local board of health, with whom he came in contact.

On the contrary, it was apparent that one or more of the leading property owners in that community, the President and others of the village board of trustees and at least one member of the water board, were not acting in hearty co-operation or endorsement with the health board and their health officer. The inaction of the responsible officials of that community since your communication of last March is very largely attributable to this division in the community.

Apparently the President and other members of the village board of trustees have not realized their responsibility for conditions detrimental to the health of their citizens. Apparently these gentlemen have made no effort to point out to the citizens of that community the individual responsibility of each for improving their conditions and safeguarding the health, not only of their community, but of suppressing the danger of health conditions at Rouses Point to the outside world.

It was pointed out to your inspector that during this summer season over two hundred cruising parties, passing through Lake Champlain, have stopped at Rouses Point and that with the exception of the health officer, apparently no official in that community has taken the slightest precaution to warn such visitors of their dangerous water supply.

It is apparent that not only have some members of the official family of that village failed to realize the necessity of improving their local condition, but that there has existed in the minds of some of them a spirit of doubting the statements and recommendations of the State Department as of any weight or value; a disposition to dispute all such authoritative communication and to

play for time and delay by useless remark and argument and futile resort to private analyses for basis for further dispute.

Your inspector failed to see in the minds of many of these men the slightest indication that they had ever concentrated any thought or effort to take immediate action to better their conditions. It was manifest that the spirit of strife between at least two sides existed in this community and that other than mutual reproach and useless argument, little had been done.

It is respectfully submitted by the subscriber that the most energetic action of this Department be initiated to immediately cure this condition of inactivity. It is herewith certified:

Referring to the excuses submitted as appendix "A" that typhoid fever undeclared actually existed at Rouses Point at the time of your inspector's visit; the parties responsible for these concealed cases of typhoid fever are signaled in this report and this failure to declare such cases is not a first offense; that subject to the conditions described in this report, no proper effort for bettering of conditions pointed out to that community as dangerous by your department last spring, has been made and that there exists a condition of spite and dissention among the responsible members of that community which it is necessary to immediately correct, in order that a period of immediate activity to secure safe conditions can be brought about.

Very respectfully submitted,

WILLIAM S. MAGILL,

Director of Laboratories

ALBANY, N. Y., *October* 17, 1910.

HON. E. H. PORTER, A.M., M.D., *State Commissioner of Health, Albany, N. Y.*

SIR:— The undersigned respectfully submit a report of conditions and data of examinations resulting from a series of investigations of samples of water collected at different points from the public water supply system of Yonkers during the last year.

In this connection we beg to refer you to data concerning the public supply of Yonkers published in the annual report of this Department, Volume No. 1, 1907, pages 363 to 365, and to analytical data concerning samples of water from this public supply published in that same volume on page 371 and in the corresponding report of the following year, the analytical data of examinations of samples of water from the public supply of Yonkers, published in Volume No. 1 of the annual report for 1908, page 459, and to similar analytical data furnished you with this report on special sheet marked "Appendix A."

In addition to the dates designated as the time of taking samples within the last year, this plant has been inspected by members of the laboratory division at several other times, at which particular times conditions existed which would prevent the taking of a fair sample at the time of that inspection.

Your particular attention is invited to the following analytical data from examination of samples taken by Inspector Number Twelve, of your department, at the time of his last inspection on October 6th, 1910.

On this date bacteriological samples were collected by this inspector of the raw water from the Nepperhan River, as it passed through the inlet chamber of the old filters and corresponding bacteriological samples were collected from every filter unit of the Yonkers system.

Numbers one and two of these units represent the effluent from the so-called old filter beds, numbers three and four from the so-called new filters. To facilitate the comparison, corresponding figures from previous examinations of these corresponding raw waters and effluents from the various units are placed in adjoining columns with the date of such examination.

The conditions of operation at the time of collection of the last samples — October 6th, last — were somewhat unusual, for the reason that the low stage of water of the Nepperhan river did not permit a constant maintenance of level of the raw water on the filters at the usual elevation, if the normal amount of filtered water was constantly pumped from the filter plant.

Therefore, the pumps were operated only part of the time, being frequently stopped to allow the water level on the filters to rise again to a suitably high point.

Such intermittence of pumping would, of course, produce marked changes in rates of filtration and constant alteration of filtration rate is, of course, not conducive to filter efficiency, but these variations of rate could not be easily avoided under the actual conditions of raw water supply.

Although the low stage of the river complicated the actual situation, there can be no doubt whatever of the possibility of purification of raw water under the actual conditions in a manner that would render the water of the effluents from the filter units of far better sanitary quality than that actually found by this examination.

You will note that the results of the examination of samples of water of the effluent from every one of the four filter units involved showed fecal organisms to be present in the filtered water and the conclusion is manifest, therefore, that the water then actually delivered from every unit of this filtration plant at Yonkers, was unsafe for human consumption.

Information concerning this water supply and filtration plant gathered at different times and from many sources, would indicate that for the two filter units, numbers three and four, the construction of which is noted in your annual report of 1907, as carried out under the direction of Messrs. Hazen & Whipple, it is evident that the design included a building to be used as a laboratory and it was then the intention to maintain a chemist and consequent permanent chemical control of the operation of this filtration plant.

The new filter units were constructed and the laboratory also, but no resident chemist has ever been provided.

At about this time the form of city government was changed and Yonkers commenced operation under a uniform charter, since which time there has evidently resulted a change of policy for the operation of this water system.

The water works of Yonkers are now under the direction of the Commissioner of Public Works and under the immediate charge of the Superintendent of Water Works.

It is understood by the present reporter that by order of the Commissioner of Public Works of Yonkers, the Superintendent of the Water Works has been instructed to operate the water filters as directed by a specified chemist, an employee for chemical work in one of the sugar factories of Yonkers.

It is understood that this chemist has at times procured samples — according to the observation of your inspector, by sending a boy to collect such samples at the filter plant — at various times and it is understood that according to the direction of this chemist a solution of hypochlorite of lime has been added to the raw water for purposes of purification and it is understood that the filtration rate for the operation of each filter unit has been directed by this chemist.

Incidentally, your inspector has learned that the sum of $1,500 per annum has been paid for these chemical services — a sum of money sufficient in the opinion of your inspector to secure the services of a competent chemist, who should be permanently established and maintained at the filter plant.

It has been determined that the operation and introduction of the solution of hypochlorite of lime above mentioned, is carried out by an ordinary laborer, who takes his orders from the chemist. The method of preparation of this solution and of its distribution to the raw water is crude in the extreme.

The solution is made by this laborer stirring in an open cask a quantity of commercial bleaching powder and water and allowing this to settle. By opening a spigot near the bottom of the cask the solution is allowed to flow into an open trough, eventually leading the solution into the raw water for treatment. The rate of flow is controlled only by the crude attempt of the laborer to adjust the quantity flowing from such spigot and it is also pointed out that this laborer leaves his work at four or five o'clock in the afternoon and that there is no further adjustment of flow of such solution from casks throughout the night until his return at the usual working hour of the following day.

At the various times when visited by one or more of your inspectors, it has been found that the raw water going upon one filter

was treated by such hypochlorite of lime solution, when the raw water going upon a corresponding adjoining filter unit was untreated and inquiries made by your inspectors to determine the method of such procedures have been unable to discover any method whatever, as replies have been given that such introduction of solution was made to-day for one filter unit and perhaps on the following day for another filter unit, but no key to any system of procedure for the use of such solution has been found by your inspectors.

It would be scarcely possible to devise a more crude method of utilization for such a solution, even for a very temporary expedient.

It should be most evident on the slightest consideration that such solution must of necessity be applied to raw water through a weir or orifice which would assure a constant flow of a predetermined quantity, the delivery of which could thus be maintained to a reasonable degree of accuracy.

This solution of hypochlorite of lime is applied to the raw water as it flows upon a filter unit, usually numbers three and four or one of these. It is remembered that this solution has a strong and immediate bactericidal effect upon most of the bacteria of the raw water and that it is used for this purpose.

It is pointed out, however, that one of the paramount conditions of successful operation of filters of this nature is the biological (largely bacteriological) activity going on at certain points in the filter bed — the particular utility of the so-called Schmutzdecke, the period of formation of which Schmutzdecke constitutes the so-called period of ripening of the filter bed, after which the filter becomes most biologically active and of consequent greatest efficiency.

The direct result of introduction of a solution of hypochlorite of lime to the raw water would be to sterilize this water to a more or less degree and to this extent sterilize the Schmutzdecke of the filter unit and to this extent suppress all of the biological processes of the sand filtration with a consequent retardation and diminution, if not total loss, of efficiency of every filter unit, in which case the object of slow sand filtration would be very largely diverted.

To be sure, the prevention of formation of Schmutzdecke would enable such filter to be operated for a much longer time without cleansing and for the saving of cleaning expense it might seem desirable, if no thought of obtaining a sanitary quality for the water is taken. It is needless to add that sand filtration is resorted to to render water sanitary and safe and not for puropses of saving money on cleaning.

It is suggested by your reporter in this connection that if a solution of hypochlorite of lime is to be used at any place where sand filtration is resorted to, that such solution should be added in carefully determined dosage to the effluent water of the filter unit, thus functioning as a final safeguard of its quality.

When added under these conditions, where all suspended matter would have been previously removed by the sand filtration, a far smaller amount of this hypochlorite of lime solution would be more effective for its germicidal action and the sand filters themselves would not be injured nor the biological functions be in any way retarded or diminished by the practice of such sterilization.

Under the present abnormal conditions of the water supply of Yonkers, largely resultant of the extreme drought, it would be considered most desirable to add a suitable dosage of a solution of hypochlorite of lime to all of the effluent water of every sand filter.

Your reporters are aware of the particular conditions involved in the water supply of Yonkers. They are of the opinion, however, that there should be no difficulty if these conditions are properly met in supplying to that city a water that is safe for human consumption at all times and with the present filters.

The unsatisfactory situation at Yonkers filter plant, which has been apparent throughout the past year, is quite similar to conditions of a similar filter plant at Poughkeepsie some time ago. The unsatisfactory conditions previously existing at Poughkeepsie filter plant caused the establishment of a resident chemist and since that time it is to be noted that the work of those filters and their operation have been quite satisfactory to your department.

Apparently Yonkers has a well designed filter plant, the operation of which at its highest efficiency is perfectly realizable at once

and would assure at once a safe potable water throughout any conditions of water supply that are likely to be encountered at that point for some time.

Respectfully submitted,

WILLIAM S. MAGILL
LEONARD M. WACHTER

ALBANY, N. Y., *January* 24, 1910.

DR. M. WOLF, 9 *Dock Street, Yonkers, N. Y.:*

DEAR DOCTOR:—I herewith enclose the report of the State Hygienic Laboratory on the examination of samples of water obtained at the Grassy Sprain pumping station, and at the Sawmill River filter plant by a member of our laboratory staff on January 11, 1910.

The Grassy Sprain samples did not show that fecal organisms were prevalent, though there were indications of considerable organic matter being present.

The results of the examination of the filter plant samples showed that the raw water was badly polluted and that the filter effluents examined did not show high filter efficiency.

The samples were from the new filters and it is possible that they have not as yet settled down to effective work.

Yours very respectfully,

EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *August* 29, 1910.

DR. W. S. COONS, *Health Officer, Yonkers, N. Y.:*

DEAR DOCTOR:—I transmit herewith report of the Division of Laboratories on the examination of samples of water taken from the filter plant furnishing part of your public water supply. The samples were taken by a member of our laboratory staff on August 2, 1910.

The results of the examinations indicated that the raw water was badly polluted and that at the time the samples were taken filter unit No. 4 was not operating with satisfactory efficiency.

Your new filters have now been in operation for a considerable period and should be delivering a better effluent than that shown by this examination and previous ones made by the Department for its own information.

Yours very respectfully,

EUGENE H. PORTER,

Commissioner of Health

Comparatively Tabulated Report of the Work of the New York State Hygienic Laboratory for the Year 1910

1909	Number of packages of	1910	Per cent Increase 1910 over 1909
23,588	Diphtheria Antitoxin distributed (1500 units)	36,916	56
4,313	Tetanus Antitoxin distributed (1500 units)	9,655	124
22,000	Outfits—Prophylaxis Ophthalmia	24,454	11
....	Outfits—Sputum specimens—10 months only	3,289	
....	Outfits—Widal test—10 months only	1,834	
....	Outfits—Diphtheria culture — 10 months only	9,152	
3,695	Specimens examined for Diagnosis—Total received	8,914	141

		Total received	Positive	Negative	
1,971	Diptheria cultures	6,421	1,826	4,595	225
1,766	Sputum specimens	1,861	584	1,277	5
358	Widal test (Blood serum)	632	254	378	76
2,013	Samples of water examined—Total rec'd			2,662	32
761	Chemical examinations	1,097			44
1,252	Bacteriological examinations	1,564			25

No previous record	Mail matter	Total handled of 1st class	Pieces
	Received—1st class	3,963	12,471
	Sent—1st class	8,508	12,471

No increased appropriations of 1910 over 1909.

No decrease in any item of the Laboratories' activities in 1910.

Respectfully submitted,

WILLIAM S. MAGILL,

Director of Laboratories

CANCER LABORATORY

CANCER LABORATORY

BUFFALO, *March* 6, 1911.

DR. EUGENE H. PORTER, *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I herewith transmit to you the annual report of the New York State Cancer Laboratory for the year 1910.

Goiter and Cancer in Fish. In the early part of the official year 1910 our studies into the distribution and nature of the so-called thyroid tumor of fish, which comprehends a series of tumor-like growths ranging all the way from simple enlargement (goiter) to infiltrating and metastasising neoplasms (cancer) had reached a degree of advancement which made it clear that this disease is little short of a menace to fish culture and that it bears without question an important relation to the public health. With the approbation of the Commissioner of Health the State Cancer Laboratory has since 1908 been engaged in a joint investigation of this disease with the United States Bureau of Fisheries of the Department of Commerce and Labor, George M. Bowers, Commissioner. The work has thus far consisted of experimental work in Buffalo at the laboratory and of work conducted during two summers at a government fish hatchery in a neighboring State. Besides these activities, with the co-operation of the Forest, Fish and Game Commissioner of the State of New York, we have studied for two years an epidemic of this disease in a New York State hatchery. At the beginning of the present year these investigations were sufficiently far advanced to indicate to us beyond all reasonable doubt that the disease is an infectious disease transmitted by the water and breaking out in epidemic form; that it occurs in fish living under practically wild conditions and is probably introduced into hatcheries with the fish or eggs; there finds favorable conditions for further development and assumes the astonishing epidemic character frequently observed. The disease is fundamentally that of goiter.

Goiter in Man. The distribution of goiter in human beings in the United States has never been carefully tabulated. In Switzerland and in the Alpine regions of France and Austria the disease is so extensive as to be of the greatest economic import to these countries. In Switzerland alone not less than 7 per cent. of the young men are rejected for military service on account of goiter. There are regions in which more than 70 per cent. of all the youthful inhabitants are affected by various forms of thyroid disease (goiter). In regions in which human beings have goiter the animals are also affected and it has been recently conclusively shown by the experiments of Bircher that the water from certain wells and certain water supplies which have long been known to be the cause of goiter in man, when given to animals causes the development of goiter in these animals. It has furthermore been shown that the ordinary bacteria-proof filters do not hold back this agent but that it is destroyed by boiling the water. Careful attention to the water supply in Switzerland has in some cases controlled the disease. In the district of Aargau where in the eighties not less than 59 per cent. of the inhabitants had goiter, changing the water supply and bringing water into the district from a non-goiterous region has reduced the percentage of the disease to less than two and a half per cent. We have, therefore, in goiter a serious disease affecting man and animals definitely associated with water supply. It is, therefore, not surprising to find that fish are also subject to this disease.

So important were the facts elicited from the study of goiter and cancer in fish under the joint arrangement with the Bureau of Fisheries that when the facts ascertained were, in April, 1910, placed by Commissioner Bowers and ourselves before Secretary of Commerce and Labor Nagel and President Taft, it was at once seen that the Bureau of Fisheries, for the purpose of protecting fish culture against the ravages of this disease and for the purpose of properly studying this disease in fish under suitable conditions, should be provided with a biological station for the study of fish disease. The message which the President transmitted to Congress on April 9th is herewith submitted:

CANCER IN FISHES

Message from the President of the United States, Transmitting Communications from the Secretary of Commerce and Labor, the Commissioner of Fisheries, and Dr. H. R. Gaylord, Director of the New York State Cancer Laboratory, in Respect to the Necessity for an Active Investigation into the Subject of Cancer in Fishes.

APRIL 9, 1910.— read, referred to the Committee on Interstate and Foreign Commerce, and ordered to be printed.

To the Senate and House of Representatives:

I transmit herewith communications to me from the Secretary of Commerce and Labor, the Commissioner of Fisheries, and Dr. H. R. Gaylord, director of the New York State Cancer Laboratory, in respect to the necessity for an active investigation into the subject of cancer in fishes, and I respectfully request an appropriation of $50,000 for the purpose of erecting one or more laboratories at suitable places and to provide for the proper personnel and maintenance of these laboratories. Were there a bureau of public health as I have already recommended, the matter could be taken up by that bureau and if in the wisdom of the Congress it should be provided in the near future, all such instrumentalities as that for which appropriation is here recommended may be placed in that bureau as the proper place for research in respect to human diseases.

I have directed the Secretary of Commerce and Labor and the Secretary of the Treasury to forward an estimate for the appropriation here recommended, in accordance with the procedure provided by law.

The very great importance of pursuing the investigation into the cause of cancer can not be brought home to the Congress or to the public more acutely than by inviting attention to the memorandum of Dr. Gaylord herewith. Progress in the prevention and treatment of human diseases has been marvelously aided by an investigation into the same disease in those of the

lower animals which are subject to it, and we have every reason to believe that a close investigation into the subject of cancer in fishes, which are frequently swept away by an epidemic of it, may give us light upon this dreadful human scourge.

WM. H. TAFT

THE WHITE HOUSE, *April* 9, 1910.

DEPARTMENT OF COMMERCE AND LABOR,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., *April* 8, 1910.

MY DEAR MR. PRESIDENT:— I have read the letter of Commissioner Bowers to you on the subject of cancer in fishes, and have also had an interview with Dr. Gaylord. I join in the recommendations of the Bureau of Fisheries, because the inquiry into the disease can no doubt be most advantageously pursued by investigation into the same disease as it is found to prevail in lower animals. A further reason for the investigation is that cancer among some of the species of fish seems to have reached such proportions that we are confronted with the problem whether we shall control the disease or abandon the hatcheries.

The subject is one which appeals to the judgment so strongly that I can not believe Congress will entertain any doubt as to the propriety of the appropriation.

Very sincerely yours,
CHARLES NAGEL,
Secretary

The PRESIDENT,
The White House.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF FISHERIES,
WASHINGTON, *April* 7, 1910.

TO THE PRESIDENT:— With reference to the data for a special message on the subject of cancer in fishes submitted to you by Dr. H. R. Gaylord, director of the New York State Cancer Lab-

oratory, I would say that the bureau regards this matter as of great importance and concurs in his statements. Your attention is respectfully called to the accompanying extract from my last annual report to the Secretary of Commerce and Labor, outlining the joint investigations already undertaken and showing the position of the bureau with reference to the continuation of this work.

I feel that unless this situation is handled energetically, promptly, and by a highly efficient staff of specialists, the fish-cultural operations of the bureau and of all the States will be seriously handicapped and placed in such a position in the mind of the public as to greatly impair its usefulness.

The bureau has been giving to the subject all the attention which the resources and facilities permit, but it is fully realized that the conditions already disclosed demand a special laboratory and staff for the determination of the cause and prevention of this most serious malady.

If Congress will promptly authorize the construction of the necessary laboratory, at an estimated cost of $50,000, to be located on an advantageous site to be selected later, and provide for its proper personnel and maintenance, there is every reason to believe that our fish-cultural work will soon be relieved of this great impediment, and coincidentally there will be acquired information that will be invaluable in the elucidation of the cancer problem as related to human beings.

This work can, of course, be properly conducted only in this bureau, and I would suggest that your message should specify that the proposed appropriation be made for this bureau, under which conditions we are assured of the continuation of the joint investigation already referred to with the New York State Cancer Laboratory, which is the only institution that possesses several years' experience with this particular phase of the cancer problem.

Very respectfully,

GEO. M. BOWERS,

Commissioner

[*Extract from the report of the Commissioner of Fisheries to the Secretary of Commerce and Labor for the fiscal year ending June* 30, 1909.]

Study of Fish Diseases

The bureau has continued to give attention to the diseases to which fish, particularly when under domestication, are liable, and during the past year has devoted special consideration to the occurrence of cancers and other tumorous growths. Tumors in fish have been known for many years, and the bureau has from time to time collected specimens of various kinds of tumors from different species of fish. Owing to the activity that has characterized the investigation of cancer during the past ten years, cancer in the lower animals, and in fact in all the vertebrates, becomes a subject of great interest.

Certain types of cancer appear to be more frequent than others in domesticated fish; and cancer of the thyroid gland has been observed at various time in trout and salmon at government and other hatcheries. Of late the disease seems to be on the increase, and the bureau has undertaken a thorough and systematic investigation of the entire subject of cancer in fish, and to this end has availed itself of the services of the director of the New York State Cancer Laboratory, who will pursue his studies in conjunction with the regular work of that institution. The Forest, Fish, and Game Commission of the State of New York also will cooperate in this work.

The inquiries already made have shown that the subject is very important and will require thorough study covering a considerable period of time. Careful investigation has been made in two localities where the disease is so prevalent as to constitute an epidemic; and the work will be extended so as to include a systematic examination of wild fish in open waters as well as the young and adult fish in government, state, and private hatcheries. At Buffalo, N. Y., where it is proposed to conduct experiments on fishes, arrangements have been made for the installation of two aquaria on the closed-circulation plan, with full provision for refrigeration and aëration of the water. The bureau is fully alive to the far-reaching importance of this investigation, and will devote every

energy and facility at its disposal for the prompt and thorough elucidation of the problems of the cause and prevention of this most serious malady.

[*Memorandum given to the President by Dr. H. R. Gaylord, Director of the New York State Cancer Laboratory.*]

One woman out of every eight, beyond the age of 35, dies of cancer, and one man out of every eleven.

This terrible disease has increased of late years in all civilized countries. In the United States from 9 deaths per 100,000 of population in 1850 it had risen in 1900 to 43 deaths per 100,000.

In the registration area of this country in 1906 it was 70 per 100,000. This astonishing increase has raised the deaths from this cause so that now approximately half as many die of cancer as tuberculosis.

The cause of cancer is not yet known, but investigations of the most promising character are being pressed under the inspiration of entirely new ideas, and in this work American scientists are taking a leading part.

The most fruitful of these new lines of investigation has to do with experimentation on and the distribution of cancer in lower animals.

Domestic animals of various sorts are subject to the disease.

In the United States as well as continental countries cancer in man is most prevalent in the well wooded, well watered, and mountainous regions or in poorly drained areas with alluvial soil.

These facts have attracted the attention of scientists to the possible prevalence of cancer in fish.

We now know that fish are subject to various types of cancer, certain varieties being subject to epidemics of cancer which have destroyed thousands in a single summer.

The disease has spread to such an extent that it already constitutes a menace to the propagation of this variety of fish. It is a further astonishing coincidence that the distribution of this variety of fish and the concentration of cancer in man in this country are almost identical. A map of one might well be taken as a map of the other.

[illegible] energetic action. [illegible] humanity.

[illegible] among fish suffer- [illegible] under which [illegible] that a careful [illegible] eliminate the disease [illegible] an invaluable [illegible]

[illegible] purpose [illegible] for the study [illegible] the pro- [illegible]

[illegible] the President [illegible] United States [illegible] awakened by [illegible] Bureau of Fisheries. [illegible] Buffalo Chamber of Commerce, April [illegible] the laboratory. He showed great interest [illegible] and expressed pleasure and satisfaction [illegible] The President was received at the [illegible] George H. Cobb, Thirty-fifth [illegible] Henry W. Hill, [illegible] Forest, Fish and Game James S. Whipple.

At the beginning of [illegible] Fisheries detailed Mr. Millard C. Marsh [illegible] the bureau, for the joint investigation [illegible] shared with the director of [illegible] at the government [illegible] and is now engaged at the laboratory [illegible] of a monograph on [illegible] fish which will [illegible] part of the joint investigation [illegible] Bureau of Fisheries.

[illegible] study of fish diseases recommended [illegible] message to Congress [illegible] second session of the [illegible] Congress [illegible] by the [illegible] House of Representatives in the third [illegible] Congress and was

on the calendar at the end of the session just closed, it failed to pass. For this reason the expected aid to fish culture by the establishment of a government laboratory is, for the time being, postponed and the State of New York will have to meet this serious problem in some suitable way. A conference with the Commissioner of Forest, Fish and Game will be held shortly for the purpose of determining how facilities for the continuation of this work may be secured at one of our State hatcheries and means found for the elimination of this important menace to fish culture.

Geographical Study of Goiter and Cancer in Man. There is reason to believe that goiter in human beings is increasingly prevalent in this country. With the knowledge we now have of the distribution of the disease in fish and the evidence indicating that it is an infectious disease transmitted by the water, at least so far as the fish are concerned, it becomes a matter of great importance to determine the distribution of goiter in the State of New York. The later phase of this disease in fish is cancer of the thyroid gland. The intimate relationship between goiter and cancer of the thyroid in man is well known. No less an authority on this subject than Professor Kocher told me in October last, on the occasion of the International Cancer Congress in Paris, that he had never known a case of cancer of the thyroid which had not begun as goiter. There is also a geographical relationship between the distribution of goiter in man and cancer in man. Gherard has shown that the geographical distribution of goiter and the distribution of cancer in Switzerland are almost identical. There is furthermore a rapidly increasing literature indicating a relationship between water and cancer. In this connection the distribution of cancer in the United States at the time of the census of 1900 shows that cancer is most prevalent in the mountainous, well wooded and well watered regions of the United States. It is very desirable that the geographical distribution of cancer in the State of New York at the present time should be definitely determined on a basis of new statistics, covering carefully the question of etiology and that such statistics properly collected should be compared with the distribution of goiter.

International Cancer Congress. In 1908 following a proposal which originally emanated from this laboratory an international

congress for the consideration of cancer was held in Heidelberg and Frankfort, on the occasion of the opening of the cancer laboratory and hospital directed by Professor Czerny. The circumstances leading to the organization of this congress were such that America was not represented by any of its qualified investigators. At that time there was formed an international society for the investigation of cancer. The American Association for the Investigation of Cancer was organized in the spring of 1908 and became a component part of this society in 1909 and has been co-operating with the international society since that time. The second International Cancer Congress was held in Paris from the first to the fourth of October, 1910, under the patronage of the President of the French Republic. The American Association for Cancer Research sent official delegates to this convention and the director of this laboratory was designated as one of these delegates; therefore, as the official representative of the State laboratory and as an accredited delegate of the American Association for Cancer Research, he attended the congress. The international committee in forming the official program for the congress honored this institution by naming the director in company with Professor von Dungern of the Heidelberg Institute, to present to the congress the subject of immunity to cancer. The congress was opened in the Ecole de Médicine on the first of October by the minister of education, who, in his address, referred in a complimentary way to the early and important work of the American investigators of cancer. The sessions of the congress continued on the third, fourth and fifth of October. The delegates were received officially by the mayor and heads of departments of the city of Paris in the Hotel de Ville on October fourth and were officially entertained on the fifth by the Academy of France at Chantilly. There were over 300 registered attendants at the congress and thirty-eight countries were officially represented. At least 100 of the registered scientists were specially engaged in cancer research and perhaps fifty of them exclusively engaged in the investigation of cancer. The United States sent five accredited delegates. The underlying note of the congress appeared to us to be the increased importance attributed by many investigators to the parasitic theory of cancer. The principal topics of discussion were the phenomera of immunity and there were reported to the congress

several cases of cure by vaccination. This laboratory was able to report the apparent cure of a case of sarcoma in a boy by this method. Professor Bertrand of Antwerp showed a case which had been free from evidence of cancer for over a year following the disappearance of cancer of the breast after treatment by this method, and two cases of inoperable sarcoma were reported from Denmark by Rövsing and Madsen. We believe that the principle on which this method of vaccination is based was first scientifically demonstrated in animals in 1907 in this laboratory, which experiments have been referred to in the annual reports of 1908 and 1909. The advance which we were ourselves able to report to the congress related to the observation first reported in May, 1910, before the American Association for Cancer Research in Washington, that vaccines prepared from transplantable cancers in animals produced the same reactions and apparently served the same purpose in the vaccination of human beings as vaccines prepared from human growths. It is impossible to determine what the possibilities of this method may be. It seems best applicable to cases in the early stages of the disease and has only given results in selected and favorable cases. The method is certainly not applicable in its present form to the later stages of the disease. Up to the present time we have been obliged to work with vaccines made from tumor growths which are composed largely of the tissue of the animal or the individual from which the tumors are derived. It is our belief that in the future a method of separating the essential factor from these masses of tissue may be found, in which case the outlook for vaccination as a means of treating cancer will be greatly improved.

Parasitic Theory of Cancer. Since 1901 this laboratory has constantly supported the parasitic theory of cancer. This theory has dominated the research of the laboratory and has been the principal factor in suggesting to us lines of experiment which have proven fruitful. It was the belief in this theory which, in 1904, led to the discovery of immunity in cancer, now recognized as having been first demonstrated in this institute. Efforts to test the parasitic theory of cancer by a crucial experiment have been frequently attempted. In an article on *The Analogy between Smallpox and Cancer* in which a comparison was drawn

between certain features of these diseases, it was pointed out that in smallpox, vaccine and sheep-pox we had a filterable agent, and that one point in which the comparison up to that time, failed, was in the attempts to secure a filterable agent in cancer, but it was pointed out that if such experiments could succeed, we had almost a complete case for cancer as a parasitic disease. Attempts to accomplish the separation from the cancer cell of an agent capable of producing cancer have been made from time to time in many laboratories. It is now evident, in the light of recent developments that some of these attempts have been partly successful, but were not so recognized. Within the last few months Dr. Peyton Rous of the Rockefeller Institute, in working with a transplantable sarcoma (cancer) in the chicken, repeated these filtration experiments with success. On transferring his operations to a room heated to body temperature, he succeeded in passing the agent through a so-called germ proof filter and with the filtrate thus obtained, he obtained tumors in four out of ten inoculations. This evidence when extended to other forms of transplantable laboratory cancers will complete the basis of reasoning on which we originally took our stand in favor of the parasitic theory of cancer, and again endow with significance the original experiments reported from this laboratory in 1901, in which in two cases, the peritoneal fluid from human cancer cases produced tumors in animals after injection into the circulation of these animals. It is interesting to note that at that time we took precautions to keep the fluid at body temperature and handled it by the identical method which has yielded these results which Dr. Rous has recently reported. It is needless to point out that the establishment of the parasitic theory of cancer can only endow us with the greatest feeling of optimism as to the future of cancer research. If cancer is an infectious disease then it is preventable and curable and it now behooves us to perfect experiments to determine the exact nature of the agent, and then continue the investigations into the nature of the immunity developed in cancer and the developments of the recent suggestive results which indicate the possible value of the principle of vaccination.

One characteristic of the International Congress was the prevailing feeling of optimism; it was the belief of almost every

one that cancer research has now advanced to the point where we shall shortly find means of applying to human beings the modern facts we have determined by prolonged and careful experimentation with animals.

Value of Animal Experimentation. No better evidence of the value of experimentation upon animals can be found than in the modern cancer research. Up to 1900 when experimentation with cancer animals was generally begun, cancer research had not progressed appreciably in the preceding twenty-five years and none of the most vital facts relating to the possibilities of cure for cancer as they now appear were known to medical science. These experiments have been carried out without the infliction of cruelties or severe pain of any sort on the animals, and we are to-day able to begin the application of facts thus obtained to human beings, with knowledge and some certainty of the results to be obtained; whereas if we had continued the older methods we should have had to conduct prolonged and probably fruitless experimentation upon human beings. If those who advocate the restriction of vivisection could only know the agony of mind and the suffering of those condemned to death through this terrible disease, they would better appreciate the services to humanity now being accomplished through the sacrifice of a few thousand rats and mice. For some time past in this laboratory we have been able to successfully treat animals afflicted with cancer, whereas we are only now prepared to apply these principles to human beings.

Application of New Principles to Treatment of Human Beings. It is because these more recent methods are based upon a scientific foundation that the favorable results obtained, although very meager, are of so much significance. The time has come when all research laboratories must begin the application of these facts to human beings and it is for this reason that those institutes which are equipped with hospital facilities will shortly take the lead in cancer research, whereas those which are not equipped with such facilities under their immediate direction are now seeking a means of accomplishing this end. At a meeting held in Boston in April, 1910, for the purpose of raising funds for a hospital for incurable cases of cancer, to be under the management

of the Harvard Cancer Commission, ex-President Eliot of Harvard University spoke in the following words: "I suppose we all know that cancer is the most horrible disease which afflicts humanity.

"Now, the terrible nature of the disease being clearly in our minds, what is there to encourage us to hope that science is going to find a remedy? The basis of hope is the wonderful series of conquests over formidable disease which has been achieved during the nineteenth century and the few years of the twentieth. The conquest of diseases by the progress of medical science and research is one of the most extraordinary phenomena of the nineteenth century. When we look back to Jenner's discovery, vaccination against smallpox, we see the starting point of a wonderful series of rapid and effectual discoveries in preventive and curative medicine, preventing the spread of formidable diseases, and curing formidable diseases. That is the blessed encouragement we feel to expect the successful discovery of means of prevention and of cure for cancer. Now that hope is strong, firm, assured. Without such hope we should hardly be justified in urging the free expenditure of money in the pursuits of defense against cancer. With that hope we are fully justified in urging a liberal expenditure in the continuous search for the means of preventing and curing this formidable disease."

Cancer Hospital. The New York State Cancer Laboratory has now reached a point where the work of the last thirteen years justifies the erection of a hospital to accommodate twenty-five or thirty patients, for the study of cancer in human beings and the development of methods of treatment. This laboratory was begun by a State appropriation made in 1898. In 1901 the work which had up to that time been accommodated in two or three rooms of the medical school building of the University of Buffalo, through the munificence of Mrs. William H. Gratwick was provided with the present laboratory building, erected upon a site provided with funds subscribed by public spirited citizens of Buffalo. Through this generous act of Mrs. Gratwick the State for ten years has occupied for the purposes of this work a perfectly appointed building. The influence upon the work and the stimulus which this high minded act of Mrs. Gratwick's has been to the

workers of the institution cannot be overestimated. It is therefore a pleasure to announce that Mrs. Gratwick is now prepared, if certain conditions are fulfilled by the State, to deed this handsome building to the State. It is furthermore proposed, in order that a suitable hospital may be erected immediately adjacent to the laboratory, to purchase with funds to be subscribed by Buffalo friends of the laboratory an extensive site adjoining on the west which, with the present property will likewise be deeded to the State. In order to accomplish this purpose a bill has been introduced in the Senate and Assembly, entitled "An act to amend the public health law, in relation to the establishment of a State institute for the study of malignant disease at Buffalo, providing for its management and control, and making an appropriation therefor." The time has come when this laboratory, if it is to fulfill its final purpose to the people of the State of New York, should be given a more definite form. Therefore, this bill provides that the new hospital to be erected by the State and the Gratwick Laboratory together, shall be known as the State Institute for the Study of Malignant Disease, under the management of a board of trustees. The trustees named in the bill are Roswell Park, M. D., Buffalo; John G. Milburn, New York; William H. Gratwick, Buffalo; Frederick C. Stevens, Attica; Charles S. Fairchild, New York; Charles Cary, M. D., Buffalo. The commissioner of health, is *ex officio* a member of this board of trustees. It is fair to remind the Legislature that this laboratory is the first research institution in the world established for the investigation of cancer; that since the inauguration of this work by the State, nearly all the prominent countries have established like institutions modeled after it. The institute under Professor Czerny in Heidelberg opened in 1908 has enjoyed from the first hospital and laboratory facilities combined. The Imperial Cancer Institute at the Charité Hospital likewise has hospital and laboratory facilities. The cancer commissioner of Harvard University has just made provision for the erection of a hospital of about the size contemplated for this institute, and this laboratory now lags behind these institutes, although it was the first in the field and has contributed largely to the advance of cancer research. The property which it is now proposed to deed to the

State represents an actual investment of not less than $85,000, is centrally located within a block and a half of the University of Buffalo Medical School. Such a site in the city of New York would cost many times this sum. The citizens of Buffalo are therefore providing the State with an institution complete in every respect except for a hospital building, which it is now asked that the State shall provide.

International Hygiene Exposition

In 1911 there will be held in Dresden, Germany, an International Hygiene Exposition under the patronage of the King of Saxony. An honorary committee of great German statesmen and scientists has been formed and invitations have been issued to all the civilized countries. Under the grouping of each disease, special international committees have been designated and I have the honor to state that the director of this laboratory has been named by the general committee of the exposition as a member of the group committee for the subject of cancer and also as a member of the general committee of the United States. This laboratory is preparing to exhibit photographs illustrating the results of our work. It is of special interest to note the list of subjects designated in the prospectus of the congress for exhibition under the subject of cancer.

Scheme for Exhibition on Cancer Diseases

Occurrence in men, animals and plants.

Endemic, local prevalence — cancer houses — cancer families.

Origin of cancer diseases.

Heredity.

Infection theory — degeneration theory.

Cancer in relation to occupation (chimney sweeps, paraffine, aniline, arsenic, röntgen rays, radium).

Connection between cancer in man and cancer in plants and animals.

Influence of nutrition and metabolic diseases on the origin of cancer.

Significance of syphilis for cancer.

Relation of cancer to injuries by accident.

Campaign against cancer diseases.

Protective measures against the further dissemination of cancer (obligatory notification? Disinfection?)

Success of therapy. Operation statistics. Advantages of early operation.

Utility of other methods of treatment.

Disposal of incurables.

Mortality statistics; increase of cancer.— The mortality from cancer and tuberculosis in the State of New York for the years 1909 and 1910 was as follows:

	1909	1910	Increase
Cancer	7,034	7,505	471
Tuberculosis	13,948	14,047	99

This is an increase in cancer over the previous year of 471 and in tuberculosis of ninety-nine. These figures show that in spite of the increasing population tuberculosis is practically stationary while cancer has notably increased.

Bulletin eight of the mortality statistics of the United States census bureau which covers eighteen registration States and fifty-four cities in the nonregistration area, with an estimated population of 44,877,893 which is approximately 53 per cent. of the population of the United States in 1909, is now available. The real population is found by the census just completed to be 91,500,000 and from this it appears that the registration area represents about half the population. Therefore these figures already given may be safely doubled to obtain an estimate of the cases of tuberculosis and cancer in the United States at the time of the last census 1909. This gives us tuberculosis, 163,000; cancer, 75,000.

The estimated population of the State of New York is 9,000,000 and the deaths in 1909 were 7,034. This indicates that the deaths from cancer are a little more frequent in the State of New York than the average indicated by the estimated statistics for the entire country. On the basis of 75,000 deaths from cancer for the year 1909 estimated from the above bulletin, it is safe to assume that there are not less than 200,000 sufferers from cancer in the United States and on the same basis not less than 20,000

cases in the State of New York. The relative increase of cancer pointed out in our last annual report therefore continues and cancer is steadily becoming a greater and graver problem. The purpose of this institute is to determine the nature of cancer and to find means for its prevention. It represents the modern conception of preventive medicine and it is hoped that by the State continuing to pursue the policy already inaugurated, the increasing demands upon the State to support the indigent sick may never include this disease. With the present promising outlook for the establishment of the parasitic theory of cancer, we may confidently expect that this enormous increase in cancer, when we are able to attack it with enlightened knowledge as to the cause, may be ultimately checked.

Financial statement.— The statement of the expenditures of the laboratory for the past year is as follows:

Sept. 30, 1909	— Balance	$230 98
1910	— Stock and material	2,241 57
	Equipment	3,316 85
	Expense	4,445 57
	Salaries	11,199 64
	Balance	5,565 39
		$27,000 00

Sept. 30, 1909	—Appropriation	$18,000 00
July 1. 1910	— Supply bill	9,000 00
		$27,000 00

The balance shown on September 30th is due to the reduced activities of the summer months. The increased activities and expenses in the winter months will absorb this sum during the current year.

It has been possible to increase the activities of the laboratory during the past year and with our increasing responsibilities and opportunities for work, the staff of the institution has been some-

what enlarged. Dr. Burton T. Simpson has been added to the staff as clinical pathologist. Dr. F. C. Busch is now connected with the laboratory as temporary assistant and there have been several other additions to the staff, so that the laboratory now employs regularly seventeen people. Mr. Millard C. Marsh of the Bureau of Fisheries in Washington and an assistant, A. B. Hardie, have been stationed at the laboratory by the government during the past year.

The appropriation for the coming year should be not less than that of the present year, $32,000, and if the State begins the erection of the much-needed hospital, an item of $10,000 should be placed in the supply bill to enable us to open the hospital when completed and maintain it until the meeting of the next Legislature when an appropriation for its maintenance should be provided.

The ultimate activities of this institution on a basis to enable it to successfully cope with the important problem of cancer will ultimately require from the State about three dollars per annum for every case of cancer in the State of New York. It may well appear that the expending of a sum so small in the fight against a disease so important and so disastrous is but a small demand upon the finances of the State in the interest of the public welfare.

Very truly yours,

HARVEY R. GAYLORD, M. D.,

Director

DIVISION OF ENGINEERING

CONTENTS

REPORT OF THE CHIEF ENGINEER

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to submit herewith the report of the work of the Engineering Division for the year 1910.

Experience during the past five years with methods which have been gradually developed from year to year to meet the exacting requirements of securing effective results with a limited organization indicates in the character and amount of work accomplished during 1910 that not only have these methods been carefully gauged with respect to these requirements but that no material changes are desirable with our present limitation as to resources.

The routine work of the division for 1910 has shown the usual yearly increment in volume, and as has been pointed out on former occasions this increase can only be accomplished in the future with the present organization by a curtailment, if not a sacrifice, of some of our special investigation work, much of which previous experience has demonstrated is essential in forming a resource or a working capital (as it were) for many lines of regular current work required under the Public Health Law. Notwithstanding the pressure of work during the past year, however, especially in the field of special investigations, and the fact that it has been necessary to abandon certain investigations that have been carried on for a number of years, it has been possible to concentrate the efforts of the division upon certain other special investigations which our experience has proved to be of considerable importance and productive of marked results in a practical way in the conservation of the public health of the State.

I refer more particularly to the importance and necessity of concentrating more attention on the conservation of water supplies in the future than has been done in the past. Not that we should in any way relax our efforts in restricting stream pollution, for this restriction does, and always must, bear an intimate relation, and in many cases be a prerequisite, to the protection of water supplies. That it is not the sole prerequisite, however, nor in

many cases a deciding nor even a relatively important one concerning public health we are rapidly coming to learn; and if we as a Department are to stand ready to accomplish practical results we must accept promptly the teachings of experience and take action in accordance with them. In fact the lesson seems to force itself upon us with each year's experience under existing conditions in this State that public health can be more effectually conserved through an improvement in sanitary conditions of streams used for water supplies than through the indiscriminate restriction against pollution of streams not so used.

So important is this principle and far reaching in its effect upon public health and the future work of this division, that it deserves more than passing notice. We cannot point out too strongly that it is in the contaminated water we drink and not that which flows through our community, even though at times it creates a nuisance from odors, so long as it is not used for potable purposes without purification, that the danger of contracting typhoid fever and other communicable diseases lies; and conversely if in the future we focus our attention on the conservation of our smaller streams used largely for potable purposes without purification, and see to it that our other, and, as happens, more numerous and larger streams, which ordinarily cannot safely be used for water supplies without purification, are kept in such reasonable degree of purity as will prevent any local nuisances and insure at all times a sufficient degree of purity as will make it safe after purification, not only will there be a more general conservation of public health but also of public wealth. In fact the principle of economy can be no more disregarded in the field of sanitation than in other fields of engineering; and although we can never sanction the popular tendency ofttimes observed of judging public health improvements by the standard of money value only, our obvious duty is to see that what money is expended for health work is so conserved and directed along economical lines as will result in the greatest saving of human life.

From a strictly engineering standpoint the year 1910 has been marked by the more general introduction of two comparatively new principles and methods of water purification and sewage disposal. One is an application of the principle of disinfection or

sterilization of water by the use of hypochlorite of lime; the other is the clarification of sewage by the application of the combined principle of sedimentation and prolonged septic action, accomplished in tanks of special design.

Although the sterilization of water by application of various chemicals is nothing new in principle its application on a practical and economic scale is, however, of comparatively recent date; and during 1910 the introduction of sterilizing plants in conjunction with other methods of purification or independently has been quite marked through the State. The views of the Department have been frequently asked in regard to it and it might be well to state now that whereas its success has been marked in many cases and it is destined to play an important part in the future in connection with water purification, especially as a finishing process to sand filtration, there is yet much to learn in regard to its general adaptability to waters of varying qualities. With our present limited knowledge and experience, therefore, the Department cannot at this time recommend its general and unrestricted application as an independent process, or as a substitute to well tried, efficient methods of sand filtration except in cases of emergency or for temporary use pending the construction of more reliable methods. It is expected, however, that these views may be modified in the future as knowledge and experience is joined with this method of purification.

In regard to the introduction of the new type of sewage tank referred to above for the clarification of sewage it may be said that although this so-called "Imhoff Tank" has been used with marked success in the Emscher District in Germany it is practically a new device in this country; and that although it has not up to the present time been applied on a practical scale except in experimental plants it has, however, been included in a number of sewage disposal designs presented to and approved by the Department. This tank is designed not only to remove efficiently the suspended matters in the sewage but to so control and store the sludge formed that it may be removed and disposed of in a convenient and innocuous manner; and if the results soon to be tried out in practice in this State prove as satisfactory as they have been in Germany where, however, the sewage is of a some-

what different character, these tanks may prove of considerable value to many municipalities from not only a sanitary but an economical standpoint.

The personnel of the permanent staff of the Engineering Division during 1910 has remained the same as during the previous year with one exception — the resignation of Mr. Chas. F. Breitzke, Assistant Engineer, to accept a position with the board of water supply of New York city, and the appointment in his place of Mr. A. O. True of New York city, who at the time was in the employ of the consulting engineering firm of Hering & Fuller. As has been the custom in previous years, special engineering inspectors were employed during the summer months; four during the months of June to September, in connection with the special investigation of the sanitary condition of summer resorts; and five in the month of September in connection with the special investigation of the sanitary conditions of certain watersheds of the State used for public water supplies and protected by special rules and regulations enacted by the State Department of Health.

In the subject matter of this report, as well as in the general execution and manner of filing of correspondence and records of the entire work of the Division, substantially the same classification of subjects has been adopted as in previous years and as presented in my former annual reports to you. This classification will not be repeated here since it has been adopted in the arrangement of the index of this report and is presented in full in this index.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

SEWERAGE AND SEWAGE DISPOSAL

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THEODORE HORTON,

Chief Engineer

SEWERAGE AND SEWAGE DISPOSAL

Examination and Approval of Plans for Sewerage and Sewage Disposal

If the streams of this State used as sources of water supplies are to be protected against the dangers of sewage contamination, and if the remaining ones are to be maintained in a satisfactory degree of cleanliness, it is essential that some adequate control over the discharge of sewage into these waters be vested in the central authority of the State, having jurisdiction broader than those possessed by local authorities which if left to decide these questions might be swayed by local interest or prejudice. Such control is in part granted the State Commissioner of Health under certain sections of the Public Health Law, which provide that all plans for systems of sewerage and sewage disposal of municipalities must first be submitted to and approved by him, before they may be constructed or put in operation; and that in all such cases the Commissioner shall stipulate the conditions under which sewage and wastes from these factories or sewer systems may be discharged.

Under these sections of the Public Health Law, which have been in effect since 1903, the date of the passage of the act, there is required of the Engineering Division the larger part of its routine work, comprising the examination of plans for original systems of sewerage and sewage disposal and of extensions or modifications thereof, and the preparation of permits containing the conditions as to degree and extent of purification required and to the location and manner of discharge of the effluent from the sewage disposal works.

During 1910 plans for sewerage or sewage disposal works were examined, reported upon and approved in the cases of the following municipalities:

AUBURN

On April 4, 1910, application was made by the common council of the city of Auburn for the approval of plans for a proposed sanitary sewer extension in Boston avenue. These plans were approved on April 16, 1910, and a permit was issued, allowing the discharge of sewage into the Owasco lake outlet on condition that whenever required by the State Commissioner of Health complete plans satisfactory to this Department for the interception and treatment of the entire sanitary sewage of the city or any portion of such sewage, which

is not treated by sewage disposal plants now in operation or under construction shall be prepared and submitted to this Department for approval; and that within the time limit stated in such requirement the construction of any or all works shown by said plans as may be specified shall be completed.

On September 14, 1910, application was made by the common council for the approval of plans for a sanitary sewer extension in North Nelson street. These plans were approved on September 27, 1910, and a conditional permit, similar to that granted to the common council on April 16, 1910, was issued, allowing the discharge into the Owasco lake outlet of sewage to be collected by the proposed sewer.

ALBANY, N. Y., *April* 15, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for a proposed sanitary sewer extension in the city of Auburn, Cayuga county, submitted to this Department for approval on April 4, 1910, by the common council.

The plans show that it is proposed to construct an eight-inch sewer in Boston avenue, having a slope of 1.0 per cent. The sewer is to extend easterly from the intersection of Fulton street and Boston avenue for a distance of about 280 feet.

This sewer is not within the sewer district in which the sewage disposal plant is beng constructed, namely, the first, sixth and tenth wards sewer district, but will discharge into the existing sewer in Fulton street, which is tributary to the present outfall sewer discharging into the Owasco lake outlet near State street. Plans for the sewer in this section of Fulton street and that portion of the sewer connecting with the outfall sewer were approved by the Department on December 18, 1908.

The plans now under consideration have been examined by the Engineering Division and it is found that the proposed sewer will have sufficient slope to produce self-cleansing velocities if properly constructed, and since it will never be extended will be adequate as to capacity to meet the future requirements of this portion of Boston avenue.

I, therefore, recommend that the plans be approved and a permit issued, allowing the discharge of sewage to be collected by the proposed sewer into the Owasco lake outlet near State street, on condition that whenever required by the State Commissioner of Health complete plans satisfactory to this Department for the interception and treatment of the entire sanitary sewage of the city or any portion of such sewage which is not cared for by the existing sewage disposal plant or to be cared for by the sewage disposal in the first, sixth and tenth ward sewer district now under construction shall be prepared and submitted to this Department for approval; and that within the time stated in such requirement the construction of any or all works shown by said plans as may be specified shall be completed.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

AUBURN (State Prison)

On October 6, 1910, plans were submitted to the Department for approval by the State Architect, which provided for intercepting sewers and pumping station to collect the sewage of the State prison at Auburn, and discharge into a section of the city sewer system tributary to the fourth, fifth, sixth and seventh wards sewage disposal plant. These plans were approved on October 19, 1910, **on condition that no storm or surface water from grounds, roofs or other areas shall be admitted to the sanitary intercepting sewers or pump well.**

ALBANY, N. Y., *October* 14, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for a proposed intercepting sewer and pumping station to be constructed for the purpose of collecting the sewage of the State prison at Auburn and discharging it into the city sewer system and sewage disposal plant.

These plans were submitted to this Department for approval by the State Architect on October 6, 1910, together with a copy of the specifications and a short report stating briefly the basis of design.

The matter of sewage disposal for this institution has been considered by this Department from time to time for the past three years. In December, 1907, Prof. H. N. Ogden, Special Assistant Engineer of the Department, made a report at your direction of the estimated cost of pumping the sewage of Auburn prison into the city sewer system and thence into one of the sewage disposal plants and of constructing and maintaining a separate sewage disposal plant and discharging the purified sewage into the Owasco outlet. These comparative estimates showed that the cost of disposing of the sewage by pumping into the city sewer system would be somewhat greater than the alternate plan of separate disposal. From a purely sanitary consideration, however, the former plans appear to be the more desirable and practicable owing to the limited space for a sewage disposal plant within the stockades of the prison where it would be necessary to locate such plant.

According to the report of the State Architect, the maximum population to be cared for is 1,600 persons and the present average per capita rate of water consumption is 110 gallons per day, equivalent to a flow of 122 gallons per minute. It appears also that the men's prison is at present sewered on the combined plan and that the sewage and storm water is discharged into the Owasco outlet at five different points. The women's prison is provided with storm water sewers. Practically all of the storm water in the men's prison which is collected and flows in gutters at present will be intercepted by a storm water sewer. It appears, therefore, that according to the report of the State Architect the only storm or surface water that would reach the proposed intercepting sanitary sewers in the present design would be that from a small grass plat at the eastern end of the grounds of the men's prison where a large amount of pavement and walk cutting would be necessary in order to collect a small amount of surface water.

Since the sewage from the prison is to be treated in a sewage disposal plant that will be taxed almost to its full capacity by the additional contribution of sanitary sewage from the prison it is essential that even this small amount of storm water be eliminated from the sanitary sewage to be intercepted and discharged into the pump-well. It will, therefore, be necessary to divert this storm water and dispose of it in some other way.

The plans now under consideration provide also for the collection and interception of the sanitary sewage and industrial wastes contributed by the institution, the discharge by gravity of such sewage and wastes into a pump-well located inside of the prison walls and the pumping of this sewage into the sewer system and sewage disposal plant of the fourth, fifth, sixth and seventh wards' sewer district.

Upon reaching the pumping station the sewage is to be passed through a horizontal bar screen with bars spaced one and one-half inches apart in the clear. Adequate facilities are to be provided for cleaning this screen.

Two pumps, each with a capacity of 265 gallons per minute, are to be installed in an adjacent dry pump-well. These pumps will, therefore, have a capacity equal to about four times the average flow of sewage and will be operated automatically so that both pumps can be operated at the same time if necessary, although under normal conditions one pump will be more than adequate to care for the normal flow of sewage.

The pumps will discharge the sewage through an 8" cast iron force main to a manhole at the intersection of Cross and Van Anden streets from which

effluent at the rate of about 170,000 gallons per acre per day. A portion of the filter is to be temporarily used for the disposal of sludge when troops are not at the range for practice.

The effluent from the sand filters is to be discharged into the Sparkill creek, which flows in a southerly direction from Blauvelt and empties into the Hudson river near Piermont.

It appears that the design of these plans is in general in accordance with my views and suggestions expressed during a conference held with the designing engineer from the office of the State Architect. There are, however, certain features in the details of the design that require modification in order that the sewerage system may operate satisfactorily and efficiently, viz., the substitution of manholes for inspection holes and the installation of manholes at all points of change of grade and alignment as these changes will facilitate the cleaning and inspection of the sewers.

I therefore beg to recommend that the plans be approved on the condition that the changes above referred to be made in the plans for the sewer system.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

BRONXVILLE

On October 18, 1910, application was made by the board of trustees of the village of Bronxville for the approval of plans for extensions and modifications to the sewer system of the village. These plans were approved on November 1, 1910, and a permit was issued allowing the discharge into the Bronx river of sewage to be collected by the proposed sewers after treatment in the Bronxville sewage disposal plant.

On November 9, 1910, plans for a proposed sewer extension in Palmer avenue were submitted for approval by the board of trustees. These plans were approved on November 11, 1910, and a permit was issued allowing the discharge of sewage from the proposed sewer into the Hudson river on condition that no sewage shall be admitted to or discharged from the proposed sewer until the Bronx Valley trunk sewer shall have been completed and connection made therewith.

ALBANY, N. Y., *November* 1, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for extensions and modifications to the sewer system of the village of Bronxville, Westchester county, submitted to this Department for approval by Rogers & Latimer, civil engineers, of New York city, on behalf of the board of trustees of the village on October 18, 1910.

The plans and documents submitted comprise the following:

1. Tracing and duplicate sets of blue-prints of amended plans for proposed sewers in Avon and Governor's roads, formerly known as Sagamore Circle and Beverly road.
2. Tracings and duplicate sets of blue-prints of plans and profiles of proposed sewers in Tanglewylde and Rockwell avenues.
3. Tracings and one set of blue-prints of plans and profiles of a proposed sewer extension in Tanglewylde avenue.
4. One blue-print showing profile of proposed sewer in Palmer avenue.
5. Report of designing engineers and village president together with a certified recommendation of the board of health.

The plans show that it is proposed to amend the plans of the sewers in the streets in that portion of Sagamore Park, formerly known as Sagamore Circle

and Beverly road, which were approved by this Department on February 25, 1910, but were never constructed. The location of these streets have been changed and they are now called Avon and Governor's roads.

The sewage to be collected by the proposed sewers in Avon road is tributary to the Bronxville sewage disposal plant, and the sewers in Governor's road are tributary to the Tuckahoe disposal plant. The amount of sewage that will reach the two disposal plants from the sewers shown by the amended plans will be practically the same as that provided for by the plans approved on February 25, 1910, and will be divided in about the same proportions.

The plans for the proposed sewer extension in Tanglewylde and Rockwell avenues show that it is proposed to construct some 1,543 feet of 8" sewers in these two avenues. The sewage to be collected by these sewers will be discharged into the existing sewer at the intersection of Tanglewylde avenue and Midland avenue and thence into the Bronxville disposal plant.

The plans also provide for a 6" sewer extension in Tanglewylde avenue between Pondfield road and Gardner avenue, a distance of 275 feet. This sewer is to be tributary to the existing sewer in Gardner avenue and the Bronxville avenue disposal plant.

Inasmuch as only one copy of the plan for the proposed sewer in Palmer avenue was received, action on this plan must be deferred until a duplicate copy is received.

The plans for the other sewers now under consideration, however, have been carefully examined in regard to sizes, capacities and grades and the sewers as planned are found to be adequate to meet the future requirements of the districts to be served by them on the usual assumption as to population and sewage contribution providing the sewers are properly constructed.

I therefore beg to recommend that the plans be approved and permits issued allowing the discharge of sewage from the proposed sewers into the Bronxville and Tuckahoe sewage disposal plants and the Bronx river.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 1, 1910.

Board of Trustees, Village of Bronxville, N. Y.:

GENTLEMEN:— In response to the application made to me by your board, under date of September 12, 1910, pursuant to the provisions of section 21 of the Public Health Law and certifying to me for my approval a recommendation to construct certain additions to the sewer system of the village of Bronxville made to your board by the board of Health of the village of Bronxville, pursuant to section 21 of the Public Health Law, on the grounds that the sewers of such village are insufficient to properly and safely sewer such village, said recommendation having been duly considered and approved by your board, I hereby approve such recommendation that certain additions to said sewer system be constructed, to wit:

> An 8" sewer starting at the manhole in the Midland Valley sewer at its intersection with Tanglewylde avenue, running thence easterly in Tanglewylde avenue, 400 feet to its intersection with Rockwell avenue, thence southerly in Rockwell avenue 350 feet, with the necessary manholes and appurtenances, as shown on the map submitted therewith.

The above approval is duly given this 1st day of November, 1910, in accordance with the provisions of section 21 of chapter 45 of the Consolidated Laws, the Public Health Law.

Very respectfully,

ALEC H. SEYMOUR,

Acting Commissioner of Health

ALBANY, N. Y., *November* 10, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR.— I beg to submit the following report on an examination of plans for a proposed sanitary sewer extension in Palmer avenue in the village of Bronxville, Westchester county, submitted to this Department for approval by Rogers & Latimer, civil engineers of New York city, on behalf of the board of trustees of the village on November 9, 1910.

A blue-print showing the profile of this sewer was submitted for approval on October 18, 1910, in connection with other plans for sewer extensions in the village, but this plan could not be passed upon at that time inasmuch as only one copy of the plan was submitted and the plan did not show the location of the sewer. The designing engineers were therefore notified that the matter of the approval of the plans for the proposed sewer in Palmer avenue would be considered as soon as duplicate copies of such plans, showing both plan and profile of the sewer, were received.

The records of the Department show further that plans for a sewer in Palmer avenue, formerly known as Glen Road, were approved in connection with plans for a sewer system and sewage disposal plant approved on May 14, 1902. These plans provided for a 6" sewer in Glen Road tributary to the then proposed Bronxville disposal plant. It appears, however, that this sewer was never constructed.

The plans before the Department and now under consideration show that it is proposed to construct some 400 feet of 8" sewer on a grade of 2.84 per cent. in Palmer avenue which will eventually be tributary to the Bronx Valley sewer now under construction. A flush tank is to be provided at the upper end and a manhole is to be located near the lower end of the proposed sewer and about 20' from its junction with the Bronx Valley sewer. According to the statements of the village president and the engineers the proposed sewer is not to be used and the outlet of the sewer will be sealed until the Bronx Valley sewer is in operation.

The plans have been carefully examined in reference to the size, grade, capacity and other hydraulic and sanitary features of the proposed sewer and it is found to be adequate to meet the future requirements for sanitary sewage of the district to be served by it, and I, therefore, beg to recommend that the plans be approved.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

BRONXVILLE AND TUCKAHOE

On February 25, 1910, application was made jointly by the boards of trustees of the villages of Bronxville and Tuckahoe for the approval of plans for sewer extensions in Beverly road, the Plateau and other streets in these villages. A portion of the sewage to be collected by the sewers in Bronxville discharges into the Tuckahoe sewage disposal plant and the remainder of the sewage from the Bronxville sewers discharges into the Bronxville plant, and conversely some of the sewers in Tuckahoe are tributary to the Bronxville plant and some to the Tuckahoe plant. The plans were approved on February 25, 1910, and permits were issued allowing the discharge of sewage to be collected by the proposed sewers into the Bronx river after treatment in the sewage disposal plants referred to.

ALBANY, N. Y., *February* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for proposed sewer extensions in the villages of Bronxville and Tuckahoe, submitted jointly by the trustees of the two villages on February 21, 1910.

The plans and documents comprise the following:

1. One tracing and two blue prints of a map showing plan of proposed sewers.
2. Five tracings and two complete duplicate sets of blue prints showing profiles of streets and sewers.
3. Report by the designing engineer.

The plans show that it is proposed to construct sewers in Beverly road, the Plateau, Sagamore circle, Fairview avenue, Terrace place tributary to the Tuckahoe sewer system and sewage disposal plant, and that the proposed sewers in Prescott avenue and in a portion of Beverly road are to be tributary to the Bronxville sewers and sewage disposal system.

According to the report of the designing engineer the proposed sewers will ultimately serve about eighty dwellings and care for about 32,000 gallons of sewage per day, 50 per cent. of which is to be conveyed to the Tuckahoe disposal plant and the remainder into the Bronxville. The sewers if properly constructed are adequate as to sizes and capacities to meet any probable demand that may reasonably be made upon them for a considerable period in the future.

The sewage disposal plants of the two villages, especially that of Tuckahoe, seem to have ample capacity if properly operated to care for the additional contribution of sewage to be collected by the proposed sewers. The question of sewage disposal for the two villages by means of separate disposal plants on the Bronx river watershed has come to be largely a question of temporary expediency since the sewage contributed by Tuckahoe and Bronxville will be intercepted by the Bronx Valley sewer now under construction.

I beg to recommend that the plans be approved and permits be issued allowing the discharge of additional effluent from the two sewage disposal plants into the Bronx river.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

CHAPPAQUA (Convalescents' Home)

On March 17, 1910, plans for sewerage and sewage disposal for the Convalescents' Home of the Children's Aid Society of New York city, at Chappaqua, were submitted for approval. After some correspondence with the designing engineers in reference to the basis of design and rate of operation of the sewage disposal plant the plans were approved on April 20, 1910, and a permit was issued allowing the discharge of effluent from the disposal plant into a tributary of the Saw Mill river.

ALBANY, N. Y., *April* 19, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for the Convalescents' Home, at Chappaqua, Westchester county, submitted to this Department for approval on March 17, 1910.

The Convalescents' Home, owned by the Children's Aid Society of New York city, is located near the headwaters of the Saw Mill river. Prior to 1909 the property was owned and used for school purposes by the Chappaqua Mountain Institute. The water supply is at present obtained from a spring and pumped into an underground reservoir having a capacity of 15,000 gallons.

A new water supply is being developed consisting of a 6″ driven well and a collecting gallery fed by underdrains. A pump is to be installed which will pump the water from either the well or the gallery to the old distributing reservoir and to the new storage reservoir adjacent to it which has a capacity of 51,500 gallons. The capacity of this new water supply is estimated at 12,000 gallons per day.

According to the report by the designing engineers the population of the home for the greater portion of the year will not exceed 100 persons, with a maximum of some 250 for a period from eight to ten weeks during the summer, and 270 will be reached only on occasional days. The sewage from the institution is at present discharged into a leaching cesspool near the main buildings.

It is now proposed to intercept the sewer leading to the cesspool by means of a 6" vitrified tile sewer and to convey the sewage to the new disposal site some 300 feet from one of the main buildings. The plans show only the location, size, and alignment of this sewer, a portion of which is to be laid on a curve.

It is stated in a supplementary report by the designing engineers that the sewer is to have a slope of 0.5 per cent., and that no manholes are considered necessary inasmuch as the sewer is only about 450 feet long and one end is accessible through the proposed screen chamber. It is very probable, however, that, owing to the very flat grade for a sewer of this size and the curved alignment, it will have a tendency to clog easily. In order, then, to facilitate cleaning and inspection a manhole or lamphole should be installed at each change of grade and alignment and the sewer laid straight between manholes both as to vertical and horizontal alignment, and since no facilities for flushing are provided, the grade of the sewer should be increased to 0.65 per cent.

The sewage disposal plant consists of a screening chamber, settling tank, contact beds and sand filters.

The sewage enters a screen chamber provided with a screen 10 feet wide, consisting of ⅝" iron bars spaced ¾" apart in the clear. Owing to the short distance that the sewage travels in the sewer before reaching the screen chamber and, consequently, the fresh state of the sewage it may be found necessary to install a double screen in order to prevent clogging during the night at the time of maximum flow of sewage. There is a difference of elevation of 1.4' between the inlet and the outlet pipes in the chamber.

From the screen chamber the sewage will flow into the settling tank located about fifteen feet away. This tank has but one compartment of sufficient capacity to give eleven hours' detention of sewage contributed by a population of 250 persons based on a daily water consumption of 100 gallons per capita. The tank is provided with baffle walls and the bottom slopes toward one end to a blowoff valve and pipe which extends to adjacent sludge beds where the sludge is to be disposed of by ploughing into the soil.

Adjoining the settling tank are to be placed two contact beds having a total area of .023 acres and an effective depth of 3 feet of broken stone varying in size from 1½" to 3". Each bed is to be dosed alternately by means of an automatic tipple trough which diverts the flow of effluent from the settling tank to one bed or the other.

It appears that the contact beds which are to have an effective depth of only 3 feet will be required to operate at a rate of about 1,000,000 gallons per acre per day for a considerable period during the summer. This is an excessively high rate for contact beds of this depth and will tend to clog the beds rapidly during the period of maximum sewage flow thereby increasing the cost of operation due to more frequent cleaning of the beds.

The cost of cleaning should, however, be somewhat decreased by the fact that below the effluent underdrains of the contact beds is a space filled with broken stone and provided with additional underdrains. This space varies in depth from 1.3 to 1.8 feet below the effluent underdrains and it is intended that any suspended matter that may settle down through the contact material will be collected and retained in this space to be discharged at intervals to the sludge beds through a blowoff valve and pipe.

From the contact beds the effluent is to be discharged to either of two sand filters having a combined area of about 0.1 acres and filled with sand to a depth of 3 feet. These beds will treat contact bed effluent at the rate of 250.000 gallons per acre daily on the basis of 250 persons contributing sewage at the rate of 100 gallons per capita.

The distribution of effluent over the surface of the sand filters is to be

effected by means of a wooden trough over the center line of each bed and provided with 2" openings about 5 feet apart. Directly below each opening is to be placed a splash plate intended to break the fall of the liquid and allow it to spread out over the surface of the filter.

Each sand filter is provided with four parallel lines of tile underdrains spaced 9 feet on centers, and according to the designing engineer's report the effluent collected by these underdrains can either be discharged into a trench and allowed to flow over the surface of the ground to the brook or the trench can be run continuously back and forth over the available sloping ground for a distance of about 700 feet to the brook. The best results would undoubtedly be obtained by arranging the effluent pipe or drain according to the latter alternative and in such a way as to dispose of the effluent from the sand filters by means of subsurface irrigation on the sloping area from the sewage disposal plant to the stream, and would be desirable inasmuch as the Saw Mill river is used as a source of water supply by the city of Yonkers.

I would add, in conclusion, that although the plants as shown upon the plans will probably produce a satisfactory effluent if properly constructed and operated, it is not a well-balanced design, and the cost of operation could be decreased and somewhat better results obtained if the contact beds were increased in area and depth, and if the capacity of the septic tank could be somewhat decreased.

The slope of the sewer should be increased and manholes or lampholes inserted at all changes of grades and alignments in order to minimize the tendency to clog and to facilitate cleaning and inspection.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into a tributary of the Saw Mill river, on condition that either a manhole or lamphole be installed on the sewer line at each change of grade and alignment, that the alignment be made straight between manholes, and that the grade of the sewer be increased to 0.65 per cent.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

CLARENCE (Buffalo Automobile Club)

On October 20, 1910, plans for sewerage and sewage disposal for the Buffalo Automobile Club, at Clarence, N. Y., were submitted to the Department for approval. These plans were not in satisfactory shape for approval and were returned to the designing engineer for amendment and additional data.

On November 7, 1910, plans revised in general accordance with recommendations of this Department were resubmitted for approval. These plans were approved on November 11, 1910, and a permit was issued allowing the discharge of effluent from the proposed sewage disposal plant into Ransom creek, a tributary of Tonawanda creek, on condition that a main collecting drain shall be constructed to intercept the flow from the six underdrains shown by the plans; that on this main collecting drain a manhole shall be constructed through which the entire flow from the six underdrains shall pass; and that the main collecting drain leading to this manhole shall be placed at least 50 feet from the bank of the pond at all points.

ALBANY, N. Y., *November* 3, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for sewerage and sewage disposal for the Buffalo Automobile Club at Clarence, N. Y., submitted to this Department for approval on October 20, 1910.

According to the statement of the designing engineer in his letter of transmittal, dated October 19, 1910, the club has at present about 2,200 members and the sewage disposal plant is designed on the basis of a daily contribution of sewage of 5,000 gallons.

The disposal plant consists of a settling tank, dosing chamber and subsurface irrigation field. The settling tank, which is 8'x23'x5' deep, has a capacity of about 6,900 gallons. This is adequate to give a detention of sewage of six hours when serving a population of 276 persons on the usual assumption as to sewage contribution. The settling tank, if properly constructed and operated, should furnish a satisfactory means of preliminary treatment and remove a large percentage of suspended solid matter before the discharge of the sewage to the subsurface irrigation system when serving a population of up to some 300 persons.

No means, however, are provided for cleaning the tank when required and caring for the sludge. A sludge pipe should be connected with the settling tank so that the sludge and supernatant liquid may be drawn off and discharged to a properly constructed sludge bed.

The plans also show that it is proposed to discharge the settled sewage intermittently through a 3" Miller siphon to the subsurface irrigation field located near a pond on Ransom creek tributary to Tonawanda creek. The irrigation field has an area of about 0.1 acres and although no data are submitted as to the character of the soil this area is too small to properly care for 5,000 gallons of settled sewage per day even under the most favorable soil conditions. It is impossible, however, to properly pass upon the plans unless complete data are furnished in regard to the character of the soil at the disposal area.

There are also a number of discrepancies between the plans and specifications submitted as follows:

(1) The plans show an 8" pipe from the settling tank to the disposal area while the specifications call for a 4" pipe or carrier. (It may be noted also in this connection that a .5 per cent. slope of a 4" effluent pipe from settling tank to disposal area, as specified, is too flat and should not be less than 1 per cent. for that size pipe.)

(2) The plans show 10 lines of 3" tile laterals to be laid 12" deep for the irrigation field, while the specifications call for 4 lateral drains of 4" porous tile to be placed 12" to 18" under the surface of the ground.

(3) The plans show four lines of 4" cross underdrains spaced 20 feet apart on centers and to be placed four feet deep, while the specifications call for three under cross drains 3' to 4' deep.

No data is furnished as to the proposed method of caring for the storm water from roofs, walks, grounds and other areas. Such storm water should not be admitted to the disposal plant.

It is also noted that while the elevation of each end of the sewer is shown the rate of slope or gradient is not given. Manholes should also be placed at all changes of grade and alignment.

In conclusion I would say that there were not sufficient data submitted with the plans to properly pass upon them and that additional data should be furnished in reference to the character of the soil at the disposal area; more definite data as to the area of the disposal or irrigation field which should also be enlarged; the number, size and length of the lateral distributors; the size and slope or gradient of the effluent pipe from the settling tank. and of the main sewer; and the proposed method of caring for the storm water. The plans should also provide means for cleaning the settling tank and for the proper disposal of sludge.

In addition to the above, more complete information should be submitted as to the number of persons it is expected will be at the club house at any one time, the number of inside closets, lavatories and sinks installed, the dining-room facilities provided at the club house and other data which would lead to a conclusion as to the probable amount of sewage to be treated by the plant.

I therefore beg to recommend that the plans be returned for amendment along the lines suggested above and that the designing engineer be asked to submit additional data as noted.

Yours respectfully,

THEODORE HORTON,

City Engineer

ALBANY, N. Y., *November* 9, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on a re-examination of amended plans for sewage disposal for the Buffalo Automobile Club at Clarence, N. Y., resubmitted to this Department for approval on November 7, 1910.

The plans have been revised in general accordance with the recommendations of my report of November 3, 1910, on the examination of the first set of plans submitted and the additional information required to finally pass upon the plans has also been received.

It appears from the plans and letter of transmittal of the engineer dated November 4, 1910, that all storm water is to be eliminated from the sewage disposal plant. The storm water from the roofs is to be cared for by a storm water sewer which is to discharge directly into the pond and that from the grounds, walks and drives, is to be allowed to soak into the soil.

The settling tank has been provided with a sludge pipe connected with the low section of the tank toward which bottom of the tank slopes. When ever it is required to clean the tank, the sludge and supernatant liquid is to be discharged by gravity through a 6" vitrified pipe to a sludge bed having an area of 400 square feet. This bed is to be located near the West Shore railroad track and about 400 feet from the club house.

The gradient of the 4" effluent pipe from the dosing chamber of the settling tank to disposal area has been increased to 1.0 per cent. Ten lateral distributing lines have been added to the disposal area and their length increased from 80' to 140', giving in all some 2,800 feet of tile in the distributing system. Two additional cross underdrains have been added, making a total of six lines as against four lines provided for by the first set of plans.

It appears, however, that the second discrepancy noted on page two of my former report in reference to the size of the distributing laterals has not been corrected. The plans show that it is proposed to use 3" porous tile while the specifications call for 4" tile. It appears that a better distribution of the settling tank effluent would be obtained by using 4" tile for laterals as specified in the specifications.

The area of the subsurface irrigation field has been increased to about 0.4 acres so that the disposal field will be required to treat settled sewage at the rate of about 13,000 gallons per acre per day when the maximum contribution occurs. This will amount to 5,000 gallons daily on such days of maximum attendance at the club, according to the report of the designing engineer.

The subsurface irrigation field, if properly prepared, should be able to properly care for this amount of sewage and produce a satisfactory effluent, inasmuch as the engineer states that the soil at the disposal area is of a sandy loam of good absorbing quality.

The underdrains of the irrigation field as shown by the plans discharge separately into the pond, so that if from any cause such as the work of burrowing animals or the damage to the field from surface wash during storms, holes are formed through which the effluent from the settling tank would pass directly to the underdrains, no ready means of determining such defective condition of the surface irrigation field and of insuring a proper operation of the plant would be had. For this reason it is recommended that a main collecting drain be constructed parallel to and fifty feet from the bank of the pond to intercept the six underdrains and that a central manhole be constructed on this main collecting drain or such a manhole be constructed below the last underdrain from which the final outlet will lead to the pond. In this way opportunity will be had to obtain samples of the filtrate reaching the underdrain system and any breaks in the surface of the field would be readily discovered.

In view of the above, I would recommend that the plans be approved and a permit be issued allowing the discharge into Ransom creek, a tributary of Tonawanda creek, of effluent from the proposed sewage disposal plant and that the permit contain in addition to the usual revocation and modification clauses the following provisions:

(1) That a collecting drain be constructed to intercept all cross underdrains and convey the effluent to a manhole from which it shall be discharged into the stream or pond through a single effluent or outlet sewer; and that such collecting intercepting drain shall not be nearer than fifty feet from the pond or stream at any point.

(2) That the laterals of the distributing system shall not be less than 4" in diameter.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

CLIFTON SPRINGS (Clifton Springs Sanitarium)

On September 12, 1910, plans for sewage disposal for the Clifton Springs Sanitarium were submitted for approval. These plans were approved on October 29, 1910, and a permit issued allowing the discharge into Sulphur creek of effluent from the proposed sewage disposal plant.

ALBANY, N. Y., *October* 27, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*.

DEAR SIR:— I beg to submit the following report on an examination of plans for sewage disposal for the Clifton Springs Sanitarium at Clifton Springs, Ontario county, submitted to this Department for approval by the business manager of the sanitarium on September 12, 1910.

Clifton Springs is located on Sulphur creek at its confluence with Canandiagua outlet and about five miles above the village of Phelps. At the village of Lyons, about twelve miles below Phelps, the outlet joins Ganagua creek and forms the Clyde river. This river empties into the Seneca river which is tributary to the Oswego river.

According to the report of the designing engineer the present population of the institution is 500 and the metered daily water consumption about 100,000 gallons, equivalent to 200 gallons per capita per day. It is proposed to provide for an ultimate population of 600 persons and a sewage contribution of 120,000 gallons per day. The sewage is at present discharged into Sulphur creek through a 9" outfall sewer.

The proposed sewage disposal plant which will intercept the existing sewer is to consist of a grit or screen chamber settling tank, sprinkling filter and sludge bed.

The grit chamber is divided into two compartments and has a total capacity of about 800 gallons which is sufficient to give about nine minutes' detention of sewage when kept free from detritus. The velocity of flow through the chambers will be about 6" per minute with a detention of about nine minutes when treating the sewage contributed by a population of 600 persons at the rate of 200 gallons per capita per day which is the basis of design of the plant.

One inclined bar screen is placed at the end of each grit chamber adjacent to the settling tank. The screens are to be made of 1½" x ¼" steel bars spaced ½" apart in the clear. A platform is provided to facilitate cleaning the screens and handling the screenings.

After passing through the screens the sewage flows into the settling tank divided into two compartments having a total capacity of some 3,100 gallons. Each compartment is eight feet long, four feet wide and varies in depth from six to seven feet. The average time of detention of the sewage in the tank will

be about 36 minutes and the average velocity of the sewage through the tank about 2½" per minute when the ultimate rate of contribution is 120,000 gallons per day.

A sludge pipe and 12" sluice gate is connected with the low end of the tank by means of which any accumulated sludge may be discharged by gravity to a properly constructed sludge bed located near the tank. The sludge bed is twenty feet square and is provided with underdrains placed beneath a layer of sand and gravel about one foot deep.

The sewage passes from the settling tank into a dosing chamber three feet deep through submerged outlets. The doses are to be discharged to the sprinkling filter through a 12" float valve which will tend to give intermitten discharges to the filter and in connection with the distributing system, an even distribution of sewage on the filter.

From the dosing chamber the settled sewage is to be discharged through an 8" cast-iron pipe to the sprinkling filter located about 260 feet away. The filter has an area of 0.062 acres and is to be filled to a depth of five feet witn broken stone ½" to 1" in size. The distributing system supported on piers two feet below the surface of the filter consists of a 6" cast-iron main, 4" cast-iron laterals and 2" cast-iron soil pipe risers provided with nozzles of the "Columbus" pattern spaced 10" on centers. The head at the nozzles will be about five feet.

The sprinkling filter will be required to operate at the rate of about 1,930,000 gallons per acre per day when the average contribution of sewage amounts to 120,000 gallons per day. The effluent from the disposal plant will be discharged through the existing outlet sewer into Sulphur creek near its confluence with Canandaigua outlet.

The area of the watershed of the Canandaigua outlet at the point where the effluent from the disposal works will reach it is some 216 square miles, so that, although complete purification of the sewage treated will not be obtained, there will be at all times a high dilution of the effluent entering the stream. The Canandaigua outlet is not used as a source of public water supply below Clifton Springs.

The underdrain system consists of six parallel lines of 4" farm tiles which connect with a 9" tile drain.

The plans have been carefully examined in reference to the design and rates of operation of the different parts of the plant and it is found that the proposed sewage disposal plant, if properly constructed and operated, should produce a satisfactory effluent.

I therefore beg to recommend that the plans be approved and a permit be issued allowing the discharge into Sulphur creek of effluent from the proposed sewage disposal plant.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

COMSTOCK (Great Meadow Prison)

On January 29, 1910, plans for sewage and sewage disposal for the Great Meadow Prison were submitted for approval by the State Architect. These plans were approved on February 8, 1910, on condition that the sewage disposal plant be enlarged whenever the number of persons contributing sewage to the plant is materially increased.

ALBANY, N. Y., *February* 2, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for sewerage and sewage disposal for the Great Meadow Prison to be located at Comstock, Washington county, submitted to this Department for approval on January 29, 1910.

It is stated in the report by the State Architect that the proposed prison is under construction and that this year accommodations will be provided for some 300 prisoners. It is also stated that the ultimate number to be provided for in the future is about 1,300 and that the assumed rate of water consumption is estimated at 100 gallons per capita per day based upon the quantities used at existing prisons in the State.

The water supply for this institution is to be taken from Dolph pond, located in a wooded and uninhabited region about two miles northwest of Comstock. It is estimated that this source of supply will furnish a daily yield of 260,000 gallons and a storage capacity of 31,210,000 gallons. Plans for this water supply were approved by the Department on October 25, 1909.

The plans now under consideration provide sewerage facilities for the ultimate population and sewage disposal for a population of 1,000. The sewage disposal plant consists of a settling tank and four sand filters.

The settling tank is divided into two equal compartments having a combined capacity of 27,000 gallons which is adequate to give about six and one-half hours' detention of sewage for a daily contribution of 100,000 gallon Each compartment is to be built with a hopper-shaped bottom for the accumulation of sludge which can be discharged to adjacent sludge beds through two six-inch blow-off pipes extending to within six inches of the bottom of the hopper-shaped compartment.

The last compartment of the settling tank is connected with the dosing chamber and is so arranged that one foot of sewage is drawn from the top of this compartment at each discharge of a siphon. The dosing chamber, located at the center of the filter bed area, is provided with four eight-inch alternating siphons for discharging the settling tank effluent upon the four intermittent sand filters in rotation.

These filters have an average depth of about 2.7 feet. While this depth may be adequate, a greater efficiency would undoubtedly be obtained by increasing the depth of the beds to three or three and one-half feet. Each bed is provided with an efficient system of troughs for distribution and underdrainage and have a combined area of about .45 acres. At the assumed rate of contribution of 100 gallons of sewage per capita per day for 1,000 persons, the beds have a sufficient area to treat settled sewage at the rate of 220,000 gallons per acre daily.

The plans have been carefully examined by the Engineering Division and it is found that the design of the sewage disposal plant is well balanced and if properly constructed and operated should produce a satisfactory effluent for a population up to 1,000 persons contributing sewage at a daily rate of 100 gallons per capita. The location of the plant is such that it can readily be enlarged as may be required in the future.

The plans show that it is proposed to discharge the effluent from the disposal works into a 24-inch pipe designed to carry the flow of a small stream which flows through the site of the disposal works and is tributary to the Barge canal. The flow of this stream is also carried under the proposed sewer above the disposal plant site through a 16-inch pipe. No data has been furnished by the State Architect as to the area of the watershed tributary to this stream and no attempt has been made while examining the plans to pass upon the adequacy of these pipes to care for the flow of this stream, it being assumed that the design provides for adequate waterway.

I would, therefore, recommend that the plans be approved on condition that the sewage disposal plant be enlarged as may become necessary whenever the number of persons contributing sewage to the plant is materially increased.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

DANNEMORA (Clinton Prison)

On January 4, 1910, plans for sewerage and sewage disposal were submitted to this Department for approval by the State Architect. On January 28, 1910, these plans were approved on the following conditions:

(1) That the capacity of the settling tank be increased whenever the daily contribution of sewage shall materially exceed the amount of flow which the tanks as now designed will properly treat.

(2) That a complete separation of sanitary sewage and storm water shall be effected at such time as additional purification of sewage shall become necessary.

(3) That sludge beds shall be installed if the proposed method of caring for the sludge is found to be inadequate or unsatisfactory, and at no time shall sludge be discharged into the stream.

ALBANY, N. Y., *January* 19, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*.

DEAR SIR:— I beg to submit the following report on an examination of plans for proposed sewers and sewage disposal works for the Clinton Prison, located at Dannemora, Clinton county, submitted to this Department for approval on January 4, 1910.

The present sewers are on the combined plan and discharge into an open ditch and a small stream tributary to the Saranac river. This discharge of sewage is causing and has in the past created insanitary conditions in and near the village of Dannemora.

The plans show that it is proposed to intercept the dry weather flow from the existing combined sewers which serve the State Prison, Dannemora State Hospital and part of the village of Dannemora, and to provide overflows at three different points in order to control the amount of flow through the new sewers and settling tanks in time of storms. It is stated in the report by the State Architect that owing to extensive outlay of work and money that would be required to separate the storm water from the sanitary sewage of the village, prison and hospital, it is proposed to postpone the matter of separation until such a time as filtration of the effluent from the settling tanks shall be found necessary.

It was learned that there are no records of the existing connections to the present sewer system and that it would be necessary to construct about 6,000 feet of additional sanitary sewers in order to effect a complete separation for which construction there are no funds available at the present time. The proposed sewers are, however, so designed that they can be made a part of a complete sanitary sewer system whenever the separation of sanitary sewage and storm water shall be required.

The report also states that the present population of the State institution is about 1,800 with allowance for a future population of 2,500 and that, while 100 village people are at present tributary to the sewer system, the ultimate number of persons of the village to be served by the proposed sewers is estimated at about 500 persons. The ultimate future population therefore to be served by the proposed sewers and sewage disposal plant will be about 3,000.

Although no definite data is submitted as to the source of the water supply and rate of consumption, it is intimated that the design of the sewer system is based upon an average rate of 100 gallons per capita per day allowing for a maximum rate of twice the average rate of contribution of sewage. On this assumption the proposed sewers are adequate as to sizes, capacities and grades if properly constructed to care for the contribution of sanitary sewage from the future estimated population of some 3,000 persons.

The sewage disposal plant consists of a settling tank divided into two equal longitudinal compartments, each of which is divided into two parts by a

division wall which extends to within four inches of the surface of the sewage in the tanks when full and forming a submerged weir over which the sewage must flow in passing through the tank. This arrangement is intended to facilitate the cleaning of the tank. The sewage before entering the tank is discharged into a small receiving chamber containing two six-inch outlets, one leading to each of the two longitudinal compartments of the tank and one ten-inch outlet so arranged that all the sewage can be by-passed whenever the tank is not in operation or to care for excessive contributions of sewage during storms.

The settling tank has a capacity of about 66,000 gallons which is adequate to give an eight-hour detention of sewage for the present population of 2,000. The capacity of the tank can be readily increased by a slight alteration of the outlet and inlet chambers so as to give a proper time of detention when the contribution of sewage is materially increased.

Although the plans do not show an area for the disposal of sludge, it was found upon further inquiry, that the owner of the property upon which the sewage disposal plant is to be located intends to use the sludge for the purpose of irrigation and that the land is to be properly prepared to receive and dispose of this sludge.

In conclusion I would say that although the sewer system and sewage disposal works are satisfactory as to engineering features to adequately meet the present needs of the institutions, the capacity of the settling tank should be increased whenever the contribution of sewage is materially increased, and complete separation of the sanitary sewage and storm water shall be made at such time as additional purification shall be required or upon the unsatisfactory operation of the proposed sewage disposal plant. Sludge beds should also be installed if the proposed method of caring for the sludge is found to be inadequate or unsatisfactory.

I would, therefore, beg to recommend that the plans be approved on the above conditions.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

DEPEW

On September 23, 1910, application was received from the board of trustees of the village of Depew for the approval of plans for proposed sewer extensions in Elliott avenue and tributary sewers. These plans were approved on September 27, 1910, and a permit issued allowing the discharge into Cayuga creek of sewage to be collected by these sewers after treatment in the village sewage disposal plant.

ELKA PARK (Town of Hunter)

On February 18, 1910, plans for sewage disposal for the Elka Park Association in the town of Hunter, Greene county, were submitted for approval by the superintendent of the association. These plans were returned to the designing engineer for revision and were finally resubmitted for approval on May 11, 1910.

The revised plans were approved on May 24, 1910, and a permit was issued allowing the discharge of effluent from the proposed sewage disposal plant into Cook creek, a tributary of Schoharie creek, on condition that the sewage contributed by not more than 200 persons shall be tributary to or treated by the sewage disposal plant approved this day.

ALBANY, N. Y., *February* 26, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for sewage disposal for the Elka Park Association in the town of Hunter, Greene county, submitted to this Department for approval on February 18, 1910, by the superintendent of the association, application for their approval having been submitted later by the town board.

The association comprises a summer colony having a present population of about 200 persons, and is located near Cook creek, a tributary to Schoharie creek, about three miles south of the village of Tannersville. The ultimate population is estimated at 350 persons.

The report of the designing engineer states that the association is provided with an adequate supply of pure spring water but that the present system of sewage disposal, by means of subsurface irrigation for each individual cottage, has not been entirely satisfactory.

It appears from the report, specifications and plans submitted for approval that it is proposed to provide sewerage facilities for the existing twenty-two cottages, club house and laundry.

The plans submitted show the sewage disposal plant more or less in detail, but does not show the proposed sewer system.

In order to intelligently pass upon the plans, a general plan of the sewers showing sizes, alignments, grades, manholes at all changes of grade and alignment and profile of the main sewer should be submitted for approval.

The sewage disposal plant consists of settling tank, dosing chamber, contact beds and an underground storage chamber to be used for the purpose of equalizing the discharge of effluent into the stream. The settling tank has a capacity of about 6,500 gallons, which is sufficient to give eight hours' detention for sewage contributed by the present population of 200 persons at the rate of 100 gallons per capita per day.

From the settling tank the sewage is to pass into a dosing chamber having a capacity of some 6,400 gallons and provided with two alternating siphons arranged so as to discharge the settled sewage to either or both contact beds. These beds are to be filled with broken stone to a depth of five feet and have a combined area of about 0.04 acres.

Each contact bed is provided with a timed siphon which will discharge the effluent into the storage chamber, referred to above, so that the discharge into the small stream may be regulated and not occur in large, intermittent doses.

It appears from the plans that the general principles upon which the design is based are in accordance with good practice. There are, however, several defects in details of construction and operation.

While the plans and report of the designing engineer show that it is proposed to construct both contact beds it appears from the specifications that only one of the beds is to be operated for an indefinite period after the plant is installed since the specifications require the contractor to furnish one alternating dosing siphon and one timed discharge siphon complete. The total capacity of the beds should be operated as soon as the present population is connected with the system inasmuch as these beds, with a combined area of 0.04 acres, will be required to treat settled sewage at the rate of 500,000 gallons per acre per day (with a daily contribution of 20,000 gallons). This is as high a rate as should be allowed on contact beds five feet deep.

The sewage disposal plant as designed is, however, not well balanced in regard to the relative capacity of the dosing chamber and contact beds. In order to utilize the full capacity of the contact beds the dose of sewage applied at each filling should be sufficient to fill each bed to within a few inches of the top of the broken stone. This can be accomplished either by increasing the size of the dosing chamber or by dividing the contact bed area into three compartments so as to form three beds instead of two.

The latter arrangement would be the better since the capacity of the dosing chamber shown on the plans could not be increased materially without making the time of detention too long. It appears, therefore, that in order to make the proposed plant more efficient and satisfactory there should be installed three

contact beds having a combined area of not less than 0.04 acres, and a dosing chamber having about the same capacity as the one shown on the plans or sufficient to fill the voids in each bed so that the effluent from the tank will rise to within a few inches of the top of the bed. It will be necessary, of course, to add one dosing and one discharge siphon. In this connection it is important to so design the size of the dosing chamber that each dose will nearly fill the voids in one bed, basing the estimated percentage of voids on that obtained when the beds have been in operation for some considerable time.

It appears from the plans that the underground chamber is not to be provided with manholes. It would be advisable to place such manholes over both the inlet and the outlet of this chamber in order to facilitate inspection and cleaning. Better control of the discharge of effluent from the chamber would also result if a valve chamber were constructed at one end of the compartment or outside and on line with the effluent pipe extended.

The effluent pipe to the stream, which is only four inches in diameter, should be increased to at least five inches, and manholes or inspection holes should be inserted at each change of grade and alignment.

In conclusion I would say that before the plans can be finally examined and passed upon, a plan of the proposed sewer system should be submitted and, in order to make the sewage disposal plant efficient and satisfactory, the relative capacity of the dosing chamber and contact beds should be readjusted and balanced.

The underground chamber should be provided with manholes and valve chamber and the size of the effluent pipe should be increased to at least five inches. Inspection holes or manholes should also be inserted at all changes of grades and alignment.

I therefore recommend that the plans be returned to the designing engineer for revision together with a copy of this report.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *May* 18, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following supplementary report on the examination of revised plans for sewage disposal for the Elka Park Association, in the town of Hunter, Greene county, resubmitted to this Department for approval on May 11, 1910, by the superintendent of the association.

Original plans for sewage disposal for this association were submitted for approval on February 18, 1910, but owing to a lack of sufficient data as to the sewer system and the unsatisfactory design or arrangement of details of the contact bed and underground equalization chamber the plans were returned to the designing engineer for amendment. These plans have been revised in substantial accordance with the recommendations embodied in my report dated February 26, 1910.

The plans and documents received and now under consideration consist of:

(1) Report in duplicate.

(2) Specifications in duplicate. Tracing and blue print of:

(3) Topographical map showing location of cottages, sewers and proposed disposal works.

(4) Plan and cross-sections of disposal works.

According to the plans and report of the designing engineer the present sewer system consists of four-inch house drains connected with six-inch castiron sewers laid on a grade of not less than 1.5 per cent. These sewers carry sanitary sewage only and serve thirteen cottages, one laundry, a casino and club house. The remaining eight cottages are provided with subsurface irrigation systems which are giving satisfactory results but are located so that they can be connected with the present sewer system and proposed disposal works whenever such an arrangement shall become necessary.

The sewer system which has been constructed for a considerable period is not provided with manholes. Such manholes should be constructed at all changes of grade and alignment in order to facilitate cleaning and inspection.

It appears from the plans that the association is at present provided with two settling tanks each having a capacity of some 5,500 gallons. One of these tanks serves the clubhouse and three cottages and the other tank, which is located at a considerable lower elevation, serves all but eight of the present cottages.

It is now proposed either to continue using the present settling tanks and to construct a dosing tank in connection with the proposed contact beds and equalizing chamber or to abandon the use of the present tanks and construct a new settling tank adjacent to the proposed dosing chamber. Inasmuch as the present tanks are of adequate capacity to give sufficient detention for the sewage contributed by the present population it seems unnecessary to construct a new settling tank unless these tanks are found to operate improperly.

The proposed dosing chamber is to have a capacity of 5,300 gallons and is to be provided with three alternating dosing siphons arranged so as to discharge the sewage to any one of the three contact beds. These beds have a combined area of about 0.04 acres and are to be filled with broken stone to a depth of five feet.

The rate of operation of the contact beds will be about 500,000 gallons per acre per day, assuming that 200 persons will ultimately be served by the proposed sewage disposal plant and that the rate of water consumption will amount to 100 gallons per capita per day.

The contact beds are also to be provided with automatic time siphons which are intended to regulate the time of contact and discharge the effluent into the proposed equalizing chamber.

It appears that the contact beds and equalizing chamber have been redesigned in accordance with the recommendations of my former report and the disposal works, if properly constructed and operated, should produce a satisfactory effluent.

In conclusion, I would say that the present settling tanks could be used in connection with the proposed dosing chamber and contact beds with such modification as may be found necessary to produce a satisfactory effluent or until such time as a material increase in the population or in the quantity of sewage shall require a settling tank of greater capacity.

I would, therefore, recommend that the plans be approved and a permit issued allowing the discharge of effluent from the proposed sewage disposal works into Cook creek, a tributary of Schoharie creek.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

FULTON

On September 16, 1909, plans for a change in the alignment of the sanitary sewer along the towing path in the city of Fulton were submitted for approval by the city engineer on behalf of the board of public works. A proper application was not received until January 19, 1910. On January 28, 1910, the plans were approved subject to the provisions of a permit issued on July 27, 1909, allowing the discharge into the Oswego river of sewage from the then proposed intercepting sewer.

On July 18, 1910, application was made by the board of public works for permission to discharge sewage into the Oswego river from extensions and modifications of the existing sewer system in the West Side sewer district in the city of Fulton after such sewage shall first have been passed through the sewage disposal plant. These plans were approved and a conditional permit was issued on September 30, 1910.

On October 25, 1910, plans for a proposed extension to the sewage disposal plant were submitted for approval by the city engineer on behalf of the board of public works of the city of Fulton, in conformity with the permit issued on September 30, 1910. These plans were approved on November 12, 1910, on conditions embodied in a letter to the city engineer, dated November 12, 1910, which is printed below.

ALBANY, N. Y., *January* 28, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to report on an examination of plans for a proposed change in the alignment of the sanitary sewer along the towing path in the city of Fulton, Oswego county, submitted to this Department for approval by the city engineer, September 16, 1909.

Owing to some delay complete duplicate plans consisting of five blue prints, each showing the proposed location or alignment of the sewer along the towing path, were not submitted until December 18th, and an application properly filled out by the board of public works was not received by the Department until January 19, 1910.

Plans for this section of the intercepting sewer were approved on July 27, 1909. The plans now under consideration cover changes in the alignment of this sewer near Lock No. 2 on the New York State Barge canal, and in passing through the walls of this lock. It is stated in the letter by the city engineer, accompanying the plans, that the Barge Canal Board desired the proposed changes "to better accommodate the construction which they contemplate." The size and grade of the proposed sewer is to remain the same as that shown on the plans approved in July.

I recommend that the plans be approved subject to the provisions of a permit issued on July 27, 1909, allowing the discharge of sewage from the proposed intercepting sewer into the Oswego river.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *September* 14, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for extensions and modifications of the existing sewer system in the West Side sewer district in the city of Fulton, submitted to this Department for approval by the city engineer on behalf of the board of public works, on July 12, 1910.

The plans show that it is proposed to construct nineteen sewer extensions on the west side of the river. These sewers are to be extensions or modifications to the existing sewer system in what is known as the West Side sewer district. They, however, modify but slightly the West Side sewer system approved on August 25, 1904.

The plans have been carefully examined in regard to grades, velocities, capacities and other hydraulic and sanitary features in connection with the proposed sewers, and it is found that except in the case of five of these extensions the sewers are adequate to meet the future rquirements of this district on the usual assumptions as to population and water consumption, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excessive infiltrations of ground water.

The five sewers which are not satisfactory are the proposed 6" sections in (1) West Second street between Walnut and Maple, (2) Cedar street between West Fourth and Wickham, (3) Worth street between West First and West Sixth, (4) Wickham street between Walnut and Cedar, and (5) West First street between Walnut and Cedar. Some of these sections of 6" sewers have

slopes of .45 per cent. which are entirely too flat for sewers of this size. In order to secure self-cleansing velocities 6" sewers should be constructed on a slope of not less than 0.7 per cent. The plans show that slopes of 0.7 per cent. can readily be obtained for all of these sections of 6" sewers either by raising the invert elevation of the manholes at the upper ends of these sewers or by lowering the invert of the manholes at the lower ends.

The consideration of these plans brings up the question of sewage disposal which is an important one, inasmuch as Oswego at present derives its public water supply from the Oswego river below Fulton.

The records of the Department show that plans for a sewer system and sewage disposal plant for the West Side sewer district were approved by this Department on August 25, 1904. On December 23, 1908, plans for sewage disposal were approved and a permit issued allowing the discharge of effluent from the proposed settling tank to be constructed as part of the sewage disposal plant to treat the sewage to be collected by the West Side sewer system on the condition that whenever it is deemed necessary by the State Commissioner of Health sand filters shall be constructed in accordance with the plans approved and the effluent from the settling tank shall be passed through them. This permit also limits the amount of sewage to be passed through such settling tank and subsequent filter beds to that contributed by 500 persons until the capacity of such sewage disposal plant shall be increased in accordance with plans approved by this Department.

The settling tank which is now in operation is divided into two compartments having a combined capacity of 12,960 gallons, and is adequate to give about 6 hours' detention of sewage contributed by 500 persons.

According to the report of the city engineer this settling tank serves about 250 persons at present and, after the completion of the proposed sewer extension for which plans are under consideration, will serve a population of about 2,500. It appears, therefore, that in order to comply with the requirements of the permit granted on December 23, 1908, and provide for sufficient settling tank capacity to properly treat the sewage to be contributed by a population of 2,500 it will be necessary for the board of public works of the city of Fulton to submit for approval complete, detailed plans, satisfactory to this Department, either for 4 additional 2-compartment settling tanks of the size and capacity of the existing tank so as to provide for a total capacity equal to about 5 times that of the present tank or to construct two or more additional settling tanks having a combined capacity equal to 4 times that of the existing tank. In other words, it will require settling tanks having a capacity of about 62,500 gallons to give a 6 hours' detention of sewage contributed by a population of 2,500 persons, assuming a rate of water consumption of 100 gallons per capita per day.

It will further be necessary for the city authorities, in order to comply with the permit granted to them and thereby protect the water supply of Oswego, to increase the capacity of the existing sewage disposal plant in accordance with the above suggestions and with plans to be approved by this Department, before any sewage is discharged into the proposed sewer extension.

It appears that the construction of the sand filters may be deferred until such time as in the judgment of the State Commissioner of Health a more complete purification of the sewage of the city of Fulton may become necessary, provided the settling tank now in operation be enlarged or extended so as to give a proper time of detention of sewage to be contributed by 2,500 persons.

In conclusion, I would say that the plans before the Department are satisfactory except as noted above, and they can easily be revised to meet the requirements of the Department. The question of sewage disposal, however, is an important one and has received careful consideration.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into the Oswego river of settling tank effluent, and that the permit contain in addition to the usual revocation and modification clauses the following provisions:

1. That the slope of all sections of six (6) inch sewers shown by the plans shall be increased to at least 0.7 per cent.

2. That no sewage shall be admitted to the proposed sewers until the sewage disposal plant is enlarged in complete conformity with complete, detailed plans satisfactory to this Department for the treatment of the entire sanitary sewage of the West Side sewer district, which plans shall first have been submitted to and approved by this Department.

3. That whenever required by the State Commissioner of Health complete, detailed plans satisfactory to this Department for more complete treatment of the sanitary sewage of the West Side sewer district shall be submitted to the Department for approval, and any or all portions of the sewage disposal works shown by said plans shall thereafter be constructed and put in operation when required by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer.

ALBANY, N. Y., *November* 2, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for a proposed extension to the sewage disposal plant of the city of Fulton, Oswego county, submitted to this Department for approval by the city engineer on behalf of the board of public works on October 25, 1910.

The records of the Department show that plans for a sewage disposal plant, consisting of a settling tank and sand filters, were approved on December 23, 1908. A provisional permit was issued in connection with these plans which allowed the discharge into the Oswego river of effluent from the settling tank to be constructed as part of the sewage disposal plant to treat the sewage collected by the West Side sewer system on the condition that whenever it was deemed necessary by the State Commissioner of Health sand filters should be constructed in accordance with the plans as approved and the effluent from the settling tank should be passed through them. This permit also limited the amount of sewage to be passed through such settling tank and subsequent sand filters to that contributed by 500 persons until the capacity of such sewage disposal plant should be increased in accordance with plans to be approved by this Department.

On September 30, 1910, plans for some 19 sewer extensions in the West Side sewer district tributary to the sewage disposal plant were approved. It was estimated by the city engineer that these sewer extensions, when completed, would ultimately serve about 2,500 persons.

In view of the condition of the permit issued on December 23, 1908, which limited the number of persons to be served by the settling tank to 500, the permit issued on September 30, 1910, in connection with the plans for sewer extensions approved on that date contains in addition to the usual revocation and modification clauses the condition that no sewage shall be admitted to the proposed sewers until the present sewage disposal plant shall be enlarged in full conformity with complete detailed plans satisfactory to this Department for the treatment of the entire sanitary sewage of the West Side sewer district, which plans shall first have been submitted to and approved by this Department. This permit also contains the provision that the gradients of all sections of 6-inch sewers shown by the plans should be at least .6 per cent.

In connection with the plans for an extension to the sewage disposal plant recently submitted for approval the city engineer, on behalf of the board of public works under date of October 24, 1910, requests that the board be released from the two conditions of the permit referred to above inasmuch as (1) two of the five sections 6" sewers with flat gradients could not be changed owing to existing connections and location of other piping; and (2) that the existing settling tank is giving a detention of ten and one-half hours at present and will at least not be overtaxed before January 1, 1911 (when it is expected

that the proposed extensions to the present settling tank will be completed), since only 5 per cent. of the houses to be connected with the sewers are provided with plumbing. It was further pointed out that the people whose houses are provided with proper plumbing fixtures are anxious to have them connected with the sewers and that the work could be done more easily now than in the spring owing to the conditions of the ground.

The plans before the Department and now under consideration show that it is proposed to construct an additional settling tank with three equal compartments and one dosing tank. Each compartment is 12' x 24' x 10' deep, giving a total capacity of the new tank of about 64,800 gallons, which is adequate to give about six hours' detention of sewage contributed by a population of some 2,600 persons. The total settling tank capacity will therefore be adequate to care for the sewage to be contributed by an ultimate population of 3,100 persons and this population formed the basis of design with respect to the necessary capacity of the sewage disposal plant when the original plans for the West Side sewer system and sewage disposal plant were submitted to the Department and approved in 1904.

The dosing tank, which is to be provided with two six-inch alternating siphons, will have a capacity of about 15,000 gallons. It may be necessary to add additional siphons to the dosing tank when supplementary treatment works are constructed in order to properly distribute the effluent over the sand filters.

The proposed settling tank, if properly constructed and operated, should produce a satisfactory effluent for this type of plant and, in connection with the present settling tank, should be adequate to give a satisfactory preliminary treatment of sewage when serving a population of 3,100 persons on the usual assumptions as to sewage contribution.

In view of the above, therefore, I beg to recommend that the plans for the proposed settling tank to be constructed as part of the permanent sewage disposal plant for the West Side sewer district be approved on condition that detailed plans for more complete treatment of the sanitary sewage of the West Side sewer district shall be submitted to this Department for approval whenever required and that any or all portions of the sewage disposal works shall be thereafter constructed when required by the State Commissioner of Health and that such additional siphons and dosing apparatus shall be installed in the dosing tank shown by the plans when supplementary treatment works are installed, as may be necessary to properly deliver the effluent from the five settling tanks to the supplementary treatment works when such works are required by this Department to be constructed.

Respecting the request made by the city engineer on behalf of the board of public works that the city authorities be released from the provisions contained in conditions III and IV of the permit issued on September 30, 1910, I beg to recommend that with reference to condition III, this request be granted since it appears that the gradients of three of the five sewers of which criticism was made have been increased as required, while in the case of the other two sewers of which criticism was made, existing connections are too low or storm sewer and water pipes were encountered which made the increase of gradient impracticable.

With respect to the application for permission to allow connections with proposed sewers for which plans were approved on September 30. before the completion of the additional settling tanks, it is stated by the city engineer that the bids for contracts for constructing the additional settling tanks for which plans are now before this Department for approval are to be received on November 7, 1910, and their completion is to be asked for on or about January 1, 1911. It is further stated that gaugings of the flow to the two existing tanks show that nearly 70 per cent. surplus capacity is available at present in these tanks over that for which these tanks were designed and the plans approved, while it is estimated that only about twenty-five connections out of 500 would probably be made.

In view of the foregoing, I would recommend that permission be given until February 1, 1911, for the discharge into Oswego river of such sewage as may be collected by the proposed sewers shown by the plans approved on September 30, 1910, provided such sewage is passed through the existing settling tanks.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 12, 1910.

GEORGE W. HACKETT, *City Engineer, Fulton, N. Y.:*

DEAR SIR:— I am sending you under separate cover the approved plans for additional settling tanks for the preliminary treatment of sewage to be collected by proposed extensions to the West Side sewer system for which plans were approved on September 30, 1910, the submission of such plans for approval and the construction of the additional tanks in accordance with approved plans having been required by the conditions of the permit granted on September 30th before house connections should be made with the proposed sewers.

The permit issued on September 30, 1910, above referred to, allows the discharge of effluent from the additional tanks into the Oswego river so that the granting of an additional permit in connection with the approval of the plans for additional settling tanks is not necessary, the conditions of approval of such plans being contained in this communication.

In accordance with the recommendations of the report of the chief engineer on an examination of the plans, a copy of which is herewith inclosed, I have this day approved the plans, in response to the application for their approval made by you under date of October 24, 1910, on behalf of the board of public works of the city of Fulton, under the following conditions extending and conforming to the conditions of the permit granted on September 30, 1910:

(1) That whenever required by the State Commissioner of Health, complete detailed plans satisfactory to this Department for more complete treatment of the sanitary sewage of the West Side sewer district shall be submitted to this Department for approval, and any or all portions of the sewage disposal works shown by said plans shall thereafter be constructed and put into operation when required by the State Commissioner of Health.

(2) That such additional siphon and dosing apparatus shall be installed in the dosing tank shown by the plans, when supplementary treatment works are installed, as may be necessary to properly deliver the effluent from the five settling tanks to the supplementary treatment works when such works are required by this Department to be constructed.

In your communication of October 24th you asked on behalf of the board of public works that such board be released from conditions III and IV of the permit granted on September 30, 1910, requiring an increase to 0.6 per cent. of the gradient of all six-inch sewers shown by the plans and requiring that no sewage should be admitted to the proposed new sewers until the additional settling tanks should be constructed. Your communication stated the reasons why release from these conditions was asked for and might reasonably be granted and the advisability of granting such request is fully discussed in the accompanying report of the chief engineer.

In accordance with the recommendations of said report, I hereby release the board of public works from complying with that requirement of the permit granted on September 30th which involved the increase of gradient of the sewers on Worth and Wickham streets.

Furthermore, in accordance with the recommendations of the inclosed report, permission is hereby granted to the board of public works until February 1, 1911, to discharge into the Oswego river, the sewage to be collected by the

proposed sewer extensions, provided such sewage shall be passed through the existing settling tanks pending the completion of the additional settling tanks for which plans are this day approved.

The permit embodied in this communication to become operative must first be recorded in the county clerk's office of Oswego county.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

FULTONVILLE

On September 17, 1910, plans for an extension of the trunk sewer to a new location of the settling tank near the easterly boundary line of the village were submitted for approval. The plans were approved on September 19, 1910, and a permit was issued allowing the discharge of effluent from proposed settling tank into the Mohawk river.

This permit contains, in addition to the usual revocation and modification clauses, the following conditions:

(1) That both the sewer system and the sewage disposal plant shall be constructed in full conformity with the approved plans or such as may hereafter be approved by this Department; and that all the sewage to be collected by the proposed sewers shall be passed through the sewage disposal plant.

(2) That whenever in the opinion of the State Commissioner of Health an extension or enlargement of the proposed settling tank or supplementary or additional treatment may become necessary, satisfactory detailed plans for such enlargement or for supplementary or additional treatment shall be submitted to the Department for approval, and upon approval of said plans such aditional works shall be constructed within the time limit then specified.

ALBANY, N. Y., *September* 19, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of amended plans of the sewer system of the village of Fultonville, Montgomery county, submitted to this Department for approval by the president of the board of trustees on September 17, 1910.

The plans were submitted in duplicate and show that it is proposed to change the location of the sewage disposal plant to a site on the corporation line near the river some 1,100 feet below that shown by the original plans for a sewer system and sewage disposal plant approved by this Department on October 2, 1909.

According to the statement of the village authorities, the location of the settling tank near the silk mill, as provided by these plans, is not a proper location for a sewage disposal plant as it is presumably near the built-up section of the village. It appears that the new location shown by the amended plans is better inasmuch as it will place the disposal plant in a more isolated position in regard to dwellings.

The only change in the sewer system provided by the plans now under consideration is the extension of the 15-inch outfall sewer in River street to the new site, a distance of 1,100 feet. This extension is to be of the same size and to be laid on the same slope as that portion of the outfall sewer from Franklin street east to the former site near the silk mill shown by the original plans.

I therefore recommend that the plans be approved and a permit issued allowing the discharge into the Mohawk river, in the town of Glen, near the

easterly corporation line, of effluent from the proposed sewage disposal plant and that the permit contain in addition to the usual revocation and modification clauses, the same conditions as to future treatment of sewage as were embodied in the permit issued on October 2, 1909.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

HASTINGS-ON-HUDSON

Plans for sewerage and sewage disposal for the Hudson Heights sewer district in the village of Hastings-on-Hudson were submitted for approval by Ward Carpenter & Co., civil engineers, on behalf of the board of trustees of the village early in January, 1910.

After considerable correspondence and several conferences between this Department and representatives of the owners of the Hudson Heights property, and after a number of revisions of the plans, they were finally approved on September 22, 1910, and a permit was issued allowing the discharge into the Saw Mill river of effluent from the proposed sewage disposal plant on condition that the amount of sewage to be passed through the sewage disposal plant is hereby limited to that contributed by 100 persons until the capacity of such sewage disposal plant shall be increased in accordance with plans approved by this Department.

ALBANY, N. Y., *January* 19, 1910.

WARD CARPENTER & CO., *Tarrytown, N. Y.:*

GENTLEMEN:— In further reference to the plans for sewage and sewage disposal plans for the section of the village of Hastings, known as "Hudson Heights," I beg to say that after carefully considering the plans we find that they are not only defective in certain features, but that there are other features concerning the Public Health Law and the requirements of this Department for the submission of plans which require further consideration.

Under the Public Health Law there is no provision made whereby the State Commissioner of Health can accept and approve plans submitted by individuals or real estate corporations, and it has been my custom that plans for private development areas be accepted by the village and be presented to the Department by the village before any approval is given of them. In explanation of this, I would point out that it is not practicable for this Department to deal directly with such companies and that practically there is no responsibility attached to any approved plans or a permit when issued to a private party or company. In other words, as soon as a land company has sold its property to various individuals, the company may cease to exist and it would be a very difficult matter to hold the individual property owners responsible for any failures on the part of said company.

If, however, the village will accept the plans of the private company and will make application to the Department and take the responsibility of taking over these sewers and maintaining the sewage disposal plant in the future, this Department can then have some definite guarantee as to the proper construction and operation of the proposed plant. I would, therefore, suggest that you take this matter up at once with the president of the village or the board of trustees and come to some agreement or arrangement whereby the village may construct and operate the necessary sewers and sewage disposal plant for this district of Hudson Heights.

In regard to the plans themselves, there are two general defects; one is that they do not show all of the sewers which will ultimately contribute sewerage to this disposal plant and consequently it will not be possible for me

to determine the suitability of the plant for this ultimate requirement. Further than this no grades are shown upon the sewers as required in the rules and regulations of this Department which have been furnished your engineers.

Further than this, the contact beds and the sand filter areas are entirely too small for the population which you propose to connect this sewer within the next few years; viz., 125 persons. This matter, as well as the former referred to, were taken up in detail by our Chief Engineer, Mr. Horton, during his recent visit to Hastings where he met one of your engineers, and looked over the ground and pointed out to him the difficulties and desirable changes which it would be necessary to make in the plans before they could be approved by him.

Since I have already suggested that you take this matter up with the village, I would suggest that it would be well for it individually or for them and you jointly to consider not only one treatment by the means which are shown upon the plans submitted by the engineers, Ward Carpenter & Co., but that other means of sewerage and disposal of this whole section lying in the western portion of the village be considered and a sewage system and disposal works, on a more comprehensive scale for this entire section, be considered and developed.

I will therefore await further advice from you as to the success you have had in reaching an agreement with the village board concerning either the present plans or the more comprehensive plan as just referred to, and as soon as such comprehensive plans or corrected plans for the individual plant now under consideration are submitted, your plans will be at once considered and examined.

Respectfully yours,
EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *July* 20, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for sewerage and sewage disposal at Hudson Heights, Hastings-on-Hudson, in the county of Westchester, submitted to this Department for approval by the board of trustees of the village of Hastings-on-Hudson.

Hudson Heights is a large tract of land owned by the Hudson P. Rose Co. in the village of Hastings-on-Hudson. There are at present five houses on this property and it is expected that this number will be increased to fifteen or twenty-five within the next two years.

Plans for sewerage and sewage disposal for this territory were submitted to this Department for approval early in January, 1910, by the designing engineers, but owing to the inadequate size of the sewage disposal plant and the lack of proper application from village authorities these plans were returned for amendment. As the result of an inspection of the proposed location of the sewage disposal plant by me, several conferences and considerable correspondence with the representatives of the H. P. Rose Co. and this Department, amended plans, revised in general in accordance with the recommendations of this Department were finally resubmitted for approval on July 8, 1910. An application properly filled out and signed by the board of trustees of the village of Hastings-on-Hudson, asking for the approval of these plans was also received on June 10, 1910.

The revised plans now under consideration show that it is proposed to construct some 3,000 feet of 8″ sewers in Mount Hope boulevard and Stanley avenue. This sewer is to have a slope of from 0.5 per cent. to 14 per cent. and is to extend from a point some 200 feet west of Le Furgy avenue to a proposed sewage disposal plant near Saw Mill river and about 400 feet from the Mount Hope station on the Putnam division of the New York Central and Hudson River railroad. This sewer is adequate as to size and capacity to

meet the probable future demand for the conveyance of sanitary sewage that may be made upon it in the future, provided that in construction the sewers will be made sufficiently water-tight to prevent excessive infiltration of ground water.

The proposed sewage disposal plant consists of a settling tank, a contact bed and a sand filter. The sewage enters the settling tank through a submerged inlet near the middle of the long side of the tank and is discharged into the contact bed through a submerged outlet formed by connecting a riser pipe with a collecting box placed across the end of the tank near the inlet pipe.

This arrangement requires modification inasmuch as the provision for the sewage entering the tank so near the outlet will tend to cause the sewage to flow directly from the inlet to the outlet, thus leaving a large portion of the tank in a stagnant condition. In order to utilize the entire capacity of the tank and thereby make it more efficient, the inlet should be located at the opposite end from the outlet.

From the settling tank the sewage is to flow continuously into the contact bed filled with two-inch broken stone to a depth of thirty-six inches laid upon a layer of field stone varying in depth from six inches to eight inches. This layer of large stone is intended to act as a system of underdrains. When the contact bed is filled with sewage to a depth of about thirty-six inches, a three-inch Miller siphon will discharge the contents to the distributing system of the sand filter. Better results would undoubtedly be obtained if the contact bed be divided into two units having a combined area and depth equal to that of the proposed contact bed inasmuch as smaller and more frequent doses would be delivered to the sand filters. Under the proposed arrangement only one and one-half fillings of the contact bed would obtain per day for the maximum contribution of sewage which the disposal plant is designed to treat and a considerable period of the time would be consumed in discharging each dose to the filter. Furthermore, each dose of contact bed effluent although some time is required for its discharge, will be sufficient to flood the sand filter to depth of one foot, which is undesirable inasmuch as too rapid a rate of filtration will result.

It is important that a satisfactory effluent from the proposed sewage disposal plant be obtained since a portion of the public water supply of the city of Yonkers, although filtered, is taken from the Saw Mill river a few miles below the point of discharge.

It appears therefore that while the plans have been designed in general accordance with the suggestions of this Department, there are certain features in the details of the design that require modification in order that the sewage disposal plant may operate more satisfactorily and efficiently, viz., (1) placing the inlet pipe of the sewer at the opposite end of the settling tank from the outlet; (2) dividing the contact bed into two units having a depth and area equal to that of the proposed bed.

I therefore beg to recommend that the plans be returned to the designing engineers for amendment in accordance with the above suggestions.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *September* 16, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of amended plans for sewage disposal at Hudson Heights, Hastings-on-Hudson, in the county of Westchester, resubmitted to this Department for approval by Ward Carpenter & Co., civil engineers, on behalf of the Hudson P. Rose Co., application for permit having been submitted by the board of trustees of the village of Hastings-on-Hudson.

The plans have been before the Department since January, 1910, and have been the subject of several conferences and considerable correspondence be-

tween this Department and representatives of the owners of the Hudson Heights property. The plans have finally been revised in accordance with the recommendations embodied in my report on an examination of plans for sewage disposal at Hudson Heights, dated July 20, 1910. Reference is made to this report for a discussion of the sewer district plant and of the plans that have been under consideration from time to time.

As noted in the last report, the proposed sewage disposal plant consists of a settling tank, contact beds and a sand filter.

The settling tank has a capacity sufficient to give about ten hours' detention of sewage contributed by a population of 100 persons assuming a rate of water consumption of 100 gallons per capita per day. From the settling tank the sewage passes through a submerged outlet controlled by the Merritt air-lock inlet feeds into either of the two contact beds. These contact beds are filled with broken stone to a depth of three feet and have a combined area of about 0.033 acres, which permits of a rate of operation of about 300,000 gallons per acre per day on the above assumption as to population and water consumption.

The contact bed effluent is then to be discharged to the distributing system of the sand filter by means of Merritt air-lock discharge siphons. The sand filter is to be provided with two longitudinal lines of underdrains which connect with a six-inch collecting drain and outlet pipe. The underdrains are to be covered with a six-inch layer of one-half inch broken stone; over the broken stone are placed eighteen inches of coarse sand and a top layer of medium sand twelve inches deep.

The sand filter has an area of about 0.026 acres and will be required to treat the contact bed effluent at the rate of about 384,000 gallons per acre per day when serving a population of 100 persons contributing sewage at a daily rate of 100 gallons per capita.

In conclusion I would say that the proposed sewage disposal plant, if properly constructed and operated, should produce a satisfactory effluent when treating sewage contributed by a population up to 100 persons on the usual assumptions as to water consumption. Whenever the population to be served by the disposal works shall exceed 100 persons it will be necessary to increase the plant in accordance with plans to be approved by this Department.

I therefore recommend that the plans be approved and a permit be issued allowing the discharge into the Saw Mill river of effluent from the proposed sewage disposal plant, and that the permit contain in addition to the usual revocation and modification clauses, the provision:

> That the amount of sewage to be passed through the sewage disposal plant shall be limited to that contributed by 100 persons until the capacity of such sewage disposal plant shall be increased in accordance with plans approved by this Department.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

On October 1, 1910, plans for a sewer extension in Broadway in the village of Hastings-on-Hudson were submitted for approval by the board of trustees. These plans were approved on October 28, 1910, and a permit was issued allowing the discharge into the Hudson river of sewage from the proposed sewer on condition that whenever required by the State Commissioner of Health detailed plans satisfactory to this Department for such intercepting sewers as may be necessary to convey the entire sanitary sewage of the village to a suitable site for sewage disposal works together with detailed plans for sewage disposal works to treat the entire sanitary sewage of the village, accompanied by a proper application from the village authorities for the approval of such plans, shall be submitted to this Department for approval; and that such intercepting sewers and any or all portions of such sewage disposal works as may be designated shall be constructed and put into operation whenever required by the State Commissioner of Health.

On November 28, 1910, plans for proposed sewers in Warburton avenue and in the "Uniontown" sewer district were submitted for approval. These plans were approved on December 23, 1910, and a permit was issued allowing the discharge into the Hudson river of sewage from the proposed sewers. This permit contains in addition to the usual revocation and modification clauses the following conditions:

1. That on or before January 1, 1912, the village of Hastings-on-Hudson shall submit for approval detailed plans satisfactory to this Department for intercepting sewer for collecting and conveying the entire sanitary sewage of the village to a suitable site or sites for sewage disposal works.

2. That on or before January 1, 1912, the village of Hastings-on-Hudson shall submit for approval detailed plans satisfactory to the Department, providing for preliminary treatment of the entire sanitary sewage of the village, comprising screening, sedimentation or septic action or a combination of these methods, accompanied by general plans for additional and more complete treatment of the sewage.

3. That any or all portions of such intercepting sewers and sewage disposal works shall be constructed and put in operation whenever required by the State Commissioner of Health.

ALBANY, N. Y., *October* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for the proposed sewer extension in the village of Hastings-on-Hudson recently submitted to this Department for approval by Ward Carpenter and Company, Civil Engineers and Surveyors of Tarrytown, N. Y., on behalf of the board of trustees.

The records of the Department show that plans for a comprehensive sewer system for the village were approved on September 21, 1894, and that amended plans were approved by the Department on January 25, 1895.

The plans now under consideration show that it is proposed to construct some 1,863 feet of 10" sewer in Broadway from the village line of Dobbs Ferry to Edgar's lane. The sewer is to have a slope of from 0.53 per cent. to 1.23 per cent, and is to discharge into the existing sewer at the interception of Broadway and Edgar's lane. The sewage to be collected by the proposed sewer is to be discharged into the Hudson river at the wharf near the foot of Maple street extended.

The sewer which it is now proposed to construct is shown by the plans approved on October 4, 1894, referred to above.

The plans have been carefully examined in regard to grades, velocities, capacities and other hydraulic and sanitary features in connection with the proposed sewer, and it is found to be adequate to meet the future requirements for sanitary sewerage for the section to be sewered by it on the usual assumption as to population and water consumption, and assuming that in construction the sewer will be made sufficiently water tight to prevent excessive infiltration of ground water.

It should be kept in mind that the time is approaching when preliminary treatment, at least, should be given the sewage from Hastings-on-Hudson before its discharge into the Hudson river. However, in view of the fact that the proposed sewer is shown on the plans approved in 1894, and in order that no unnecessary delay in constructing the sewer may result it would seem that approval of the plans might be given, provided the permit issued includes a clause requiring the submission of plans for intercepting sewers and sewage disposal works when required by this Department.

I would, therefore, recommend that the plans be approved and a permit for the discharge into the Hudson river of sewage to be collected by the proposed sewer be issued which shall contain, in addition to the usual revoca-

tion and modification clauses, the provision that whenever required by the State Commissioner of Health detailed plans be submitted to this Department for intercepting sewers and sewage disposal works to treat the entire sewage of the village, and that such intercepting sewers and sewage disposal works shall thereafter be constructed and put into operation when required by the State Commissioner of Health.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 9, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for proposed sewer extensions in the village of Hastings-on-Hudson, Westchester county, submitted to this Department for approval by Ward Carpenter and Company, Civil Engineers and Surveyors of Tarrytown, on behalf of the board of trustees, on November 28, 1910.

The records of the Department show that original plans for a sewer system for the village were approved on September 21, 1894, and amended plans were approved on January 25, 1895. These plans provided for the discharge of untreated sewage into the Hudson river at several points.

Plans for an extension to the sewer system in Broadway were approved on October 28, 1910. The permit issued in connection with the approval of these plans contains in addition to the usual revocation and modification clauses the condition:

> "That whenever required by the State Commissioner of Health detailed plans satisfactory to this Department for such intercepting sewers as may be necessary to convey the entire sanitary sewage of the village to a suitable site for sewage disposal works, together with detailed plans for sewage disposal works to treat the entire sanitary sewage of the village, accompanied by a proper application from the village authorities for the approval of such plans, shall be submitted to this Department for approval; and that such intercepting sewer and any or all portions of such sewage disposal works as may be designated shall be constructed and put into operation whenever required by the State Commissioner of Health."

The plans now before the Department and under consideration show that it is proposed to construct some 1,600 feet of 8" and 10" sewer in Warburton avenue in general accordance with the plans approved in 1894, except that the proposed outlet into the Hudson river is to be located about 1,000 feet south of one of the outlets provided for by the original plans. Although the slope of the ground is such that the flow of sewage would be in the opposite direction from that provided for by the plans the engineers state in their report that it would be practically impossible to get a right-of-way for an outfall sewer into the river at a point farther north and the outfall sewer would also be longer at any other point than that shown by the plans. The cut, however, does not exceed 15 feet and it is pointed out that a deep cut is desirable inasmuch as the property on the westerly side of Warburton avenue is considerably below the street level. The 8" sewer has a slope varying from 0.75 per cent. to 1 per cent., and the 10" sewer is to be laid on a slope of 0.36 per cent. About 200 feet of the proposed sewer is tributary to the existing sewer in Warburton avenue. The proposed sewer extension should be adequate as to size and capacity to satisfactorily care for the sewage of the district to be served by it.

Plans are also presented which provide for sewers in the easterly section of the village located on the Saw Mill river watershed, including the Uniontown and Hudson Heights sewer districts. These sewers are for sanitary sewage only and vary in diameter from 8" to 15". It appears that the proposed sewers are somewhat larger than would be required to care for the ultimate contribution of sanitary sewage for the district to be served by them

on the usual assumptions as to population and sewage contribution. This, however, is a good fault and will insure ample capacities for future needs, provided that in the construction the sewers be made sufficiently water-tight to prevent excessive infiltration of ground water.

The sewage to be collected by the proposed sewers is to be conveyed by gravity to a pumping station located near the Putnam Division of the New York Central and Hudson River railroad at the foot of Farragut road from which it will be pumped through a 6" cast-iron force main to the existing 8" sewer in Farragut road near Merrill street, a distance of about 3,800 feet.

The sewage pumps, which are in duplicate, are to be operated by compressed air similar to the Priestman sewage ejector. According to the engineers the pumping plant is designed to care for an average flow of 300 gallons per minute or about 430,000 gallons per day, which is nearly equal to additional quantity of sewage which can be cared for by the existing 8" sewer on a 1.0 per cent. slope in Farragut road. The proposed system should be adequate to care for the district to be served by it for a reasonable period in the future, inasmuch as the present population of the sewer district is only about 600, according to the engineer's report.

In view of the fact that the plans under consideration provide for a comprehensive sewer system in a new sewer district which will greatly increase the amount of raw sewage discharged into the Hudson river, and in view of your consistent policy of removing, as far as possible, the gross pollution of the river by requiring at least screening or settling tank treatment of sewage before it is discharged into the Hudson river, especially where new sewer districts are involved, I believe that the village should be required at an early date to provide for the interception and treatment of the entire sanitary sewage of the village.

I, therefore, recommend that the plans be approved and a permit issued in connection with the approval of the plans containing, in addition to the usual revocation and modification clauses, the condition that detailed plans satisfactory to this Department for such intercepting sewers as may be necessary to convey the entire sanitary sewage of the village to a suitable site for disposal, together with detailed plans for sewage disposal works, providing for at least screening or settling tank treatment, or both, of the entire sanitary sewage of the village, be submitted to this Department for approval on or before January 1, 1912.

Very respectfully submitted,

THEODORE HORTON,

Chief Engineer

HEMPSTEAD

On October 21, 1910, plans for a sewer system and for sewage disposal works for the village of Hempstead were submitted for approval by the board of trustees. These plans were examined and returned to the designing engineer for revision as respecting the capacity and gradients of certain portions of the sewer system and the arrangement of double compartments at the screening chambers.

The plans were revised and resubmitted for approval on November 22, 1910. They were approved on December 2, 1910, and a permit was issued in connection with the approval of the plans on condition that the amount of sewage to be treated in the disposal plant shall not exceed that contributed by 5,000 persons unless the plant is enlarged in accordance with approved plans.

ALBANY, N. Y., *November* 7, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed sewer system and sewage disposal works for the village of Hempstead, Nassau county, submitted to this Department for approval by the board of trustees on October 21, 1910.

The plans were prepared by Cyril E. Marshall, civil and landscape engineer of Hempstead, and comprise blue prints of the following in duplicate:

1. Plan of the village of Hempstead east of Franklin street.
2. Plan of the village of Hempstead west of Franklin street.
3. Filter beds and outfall sewer to disposal works.
4. Profiles of sewers and streets (two sets).
5. Manholes and flush tanks.
6. Profile of outfall sewer to disposal works.
7. Pumping station No. 1 at Franklin street and Mill road.
8. Pumping station No. 2 at disposal works.
9. Disposal works.

Specifications and report by the designing engineer were also submitted in duplicate.

The report of the engineer states that the sewer system is designed on the separate plan and that all storm water from roofs, streets or other areas are to be excluded from the sewers. It is understood and appears from the plans that the system covers all portions of the built-up sections of the village, although only the northerly corporation line is shown on the plans.

The village of Hempstead is situated in the northern part of the town of Hempstead, in the county of Nassau, and has a population, according to the statement of the engineer, of about 5,000. The village is provided with a water supply taken from wells. The total consumption is apparently 500,000 gallons per day, equivalent to a per capita rate of 100 gallons per day, as this is the basis of design according to the engineer.

The village has had a somewhat erratic growth for the past twenty years, according to the census figures, which are as follows: In 1890 it had a population of 4,831; in 1900, 3,582; in 1902, 3,653; in 1905, 4,145; and according to the report of the engineer the population at present is estimated at 5,000 persons. Owing to its close proximity to New York city and the increasing facilities for transportation in Long Island the village will probably have a more rapid growth in the future, and it is stated by the engineer that there is a possibility that the village limits will be extended in the course of a few years, and that provisions for such extension have been made in the design of the sewer system.

The area of the village to be served by the proposed sewer system shown on the plans is about 670 acres of which some 90 per cent. is tributary to the pumping station located at Franklin street and Mill road, and the sewage to be collected from the remainder of the area in the southeastern portion of the village will reach the sewage disposal site directly by gravity flow through the outfall sewer into which the pumps discharge.

Inasmuch as the corporation limits are not shown on the plans as they should be, except on the north, it is impossible to determine from the plans if the proposed sewer system covers all portions of the village. According to the engineer the present population of the area covered by the proposed system is nearly 5,000 persons and, on the usual assumption of twenty persons per acre for fully developed municipalities, the ultimate population to be provided for is about 13,400. The populations which will in the immediate future contribute sewage to the pumping station in the village and the outfall sewer with corresponding flow in gallons per day based on 100 gallons (average rate of flow) and 300 gallons per capita, respectively, will be as follows:

1. Population, 4,500; flow at 100, 450,000 gallons; flow at 300, 1,350,000 gallons.
2. Population, 5,000; flow at 100, 500,000 gallons; flow at 300, 1,500,000 gallons.

The populations which will ultimately contribute sewage to the pumping station and outfall sewer, respectively, with corresponding flows of 100 and 300 gallons per capita per day will be as follows:

1. Population, 12,000; flow at 100, 1,200,000 gallons; flow at 300, 3,600,000 gallons.
2. Population, 13,400; flow at 100, 1,340,000 gallons; flow at 300, 4,020,000 gallons.

The plans have been carefully examined with respect to the sewerage system and sewage disposal works. In connection with the sewerage system the design has been carefully studied with reference to alignments, sizes, grades, capacities, facilities for cleaning, inspection and flushing, and other features of a hydraulic or sanitary nature. In connection with means for sewage disposal it has been studied with reference to general method and efficiency of the sewage disposal as a whole, and of the capacities, efficiencies and practical operation of individual structures, appurtenances and apparatus.

In reference to the sewer system, it appears that although the minimum size of sewers used is 8" there are a number of flat grades and sections of sewers, including the outfall sewer, which are inadequate as to capacity to properly care for the ultimate maximum contribution of sewage on the usual assumptions as to populations and sewage contribution.

The gradients of some of the 8" sewers are as flat as 0.2, and the consequent velocity of flow would be too low to induce a self-cleansing of the sewer and prevent stoppage from occurring. Although automatic flush tanks are to be placed at the upper ends of all sewer lines that are not to be extended the lengths of some of the 8" and 10" lines with flat gradients, especially of the former, are too great to be materially affected or benefited by such means of flushing except for comparatively short distances below the flush tanks.

The minima slopes of different size sewers which should not be decreased except in extreme cases, even where ample facilities for regular flushing are provided, are as follows:

0.35 per cent. for 8" sewers.
0.25 per cent. for 10" sewers.
0.18 per cent. for 12" sewers.
0.13 per cent. for 15" sewers.
0.10 per cent. for 18" sewers, etc.

On the usual assumption as to population and sewage contribution, i. e., 20 persons per acre at 300 gallons per capita per day, the ultimate maximum rate of contribution of sewage tributary to the 8" sewer on a 0.4 per cent. grade in Fulton avenue between Hilton avenue and Franklin street, assuming that the sewer district shown on the plan be not extended in a westerly direction, will be about 1.35 cubic feet per second and the capacity of this sewer on 0.4 per cent. grade flowing full is only about .66 cubic feet per second. On the same assumption the proposed sewers in portions of Franklin, Front and Clinton streets and Fulton avenue are not adequate to care for the probable, ultimate, future contribution of sewage.

Using the same basis of computation and assuming also that the territory covered by the proposed sewer system will not be extended the ultimate maximum rate contribution of sewage to be cared for by the 18" outfall sewer will be about 4,000,000, while the carrying capacity of this sewer on a grade of 0.2 per cent. is only about 3,000,000 gallons per day when flowing full. The size of this sewer should be increased, therefore, to at least 20" in order to properly care for the probable maximum rate of sewage contribution when the territory to be served by the proposed sewer system is fully developed.

It appears that the efficiency and capacity of the sewer system could be increased and most of the flat grades of the small sewers eliminated by running a comparatively large sewer in the streets along the creek in the eastern section of the village to a point at or near Jackson street, and by having smaller branches cross the creek at one or two points to connect with such trunk sewer. This would tend to concentrate the sewage at the upper end of the trunk sewer quickly, thus securing self-cleansing velocities by increasing the depth of flow of the sewer. Such trunk sewer could possibly be provided for in the western section of the village also.

As an alternative means for providing increased capacities of sewers, where needed, and insuring a more nearly self-cleansing velocity of flow in some of the lateral sewers, it is possible to increase the diameters of some of the main trunk and more important lateral sewers, the gradients remaining the same, and to increase the gradients of the upper sections of some of the lateral

sewers where an increase in diameter is not warranted by the amount of flow to be provided for. If especial facilities for flushing are provided at the head of such lateral sewers the danger of stoppage in these sewers will be greatly lessened. Owing to the unusual conditions obtaining at Hempstead with respect to the flatness of the area to be sewered and the height of ground water near the pumping plant as compared to the invert elevation of the main trunk sewer leading to the pumping plant, I believe that it may be found necessary to construct some of the 8" lateral sewers on gradients of from 0.25 per cent. to 0.3 per cent.

Also the grade of some of the sewers could be increased by better balancing the available fall, viz.: the 8" sewer in St. Paul road has a grade of 0.3 per cent. in the upper half of the sewer and of 0.4 per cent. in the lower section. The gradient could be changed so as to give a slope of 0.35 per cent. for its entire length.

As noted by the engineer the portion of Long Island on which the village of Hempstead is located is comparatively flat and has an average slope of about fifteen feet to the mile toward the south. The problem, therefore, of designing an efficient sewer system with adequate grades is difficult and has evidently required a great deal of study. This Department has neither the time nor facilities to do more than offer the above suggestions for improving the design as respecting capacity of the system and velocity of flow.

The alignment of all sewers are straight between manholes which are to be placed at street and sewer line intersections and at all points of change of grade and alignment. The manholes are spaced on an average of 300 feet apart and the spacing rarely exceeds 400 feet.

Automatic flush tanks four feet in diameter are to be placed at all dead ends except where sewers are to be extended. These tanks are to have a maximum depth of 6'-0" and are provided with 5" siphons. According to the profiles of the sewers and the detailed plans of flush tanks a break in the grade of the sewer is to be made 10 feet from the center of the flush tank.

The sewage from about 90 per cent. of the village is tributary to a central pumping station located near the intersection of Franklin street and Mill road.

The sewage upon reaching the pumping station is discharged into a square manhole 4'x4'x10' deep placed adjacent to the receiving well. The sewage flows into the receiving well through an opening 18" square after passing through a vertical bar screen 4 feet wide placed in front of the outlet. The screen is to consist of ½" bars spaced ½" apart in the clear. It appears that the screen cannot readily be removed and no means or facilities are provided for cleaning the screen and handling and disposing of the screening.

Although the screens in this case are primarily for the purpose of protecting the pumps by removing the coarse floating material from the sewage rather than as a means of preliminary treatment they should, nevertheless, be installed in duplicate in separate chamber so that they may be more accessible at times of clogging. Cleaning of the screens and the handling of the screenings would also be facilitated if they were to be placed in an inclined position with an operating platform slightly above the screens.

The pump well is divided into two compartments consisting of a receiving well and suction well having a combined capacity of about 18,000 gallons. Although no connection is shown between the pump and suction wells this is probably due to error in drafting. The pumps are placed in an adjacent dry well which can be drained into the suction well when empty.

According to the plans and the report of the engineer it is proposed to install at present two 6" vertical top suction volute centrifugal sewage pumps of the Worthington type with a capacity of 750 gallons per minute each, equivalent to about 2,160,000 gallons per day for the two pumps. It appears, therefore, that the pumps have a capacity equal to about 1.6 times the estimated maximum rate of contribution for the present population. The plans provide for the installation of two additional pumps whenever required. Each pump is to be driven by a direct connected 15-horsepower Wagner vertical motor with a Cutler hammer float switch and self-starting control. Alter-

nating single phase 60 cycle current of 220 volts is to be used for motive power. The static head under which the pumps will operate varies from 16 to 22 feet and the starting apparatus is designed to start the pump at different heads.

The pumps are to discharge the sewage through a 12" force main some 2,000 feet long to a manhole at the intersection of Greenwich and Grove streets from which point it flows by gravity through an 18" sewer on a grade of 0.2 per cent. to a second pumping station at the disposal site some 7,400 feet south of Grove street.

The disposal site is to be located in the sandy district to the south of the village and consists of 41 acres of land. The disposal works are ultimately to comprise four complete units each consisting of two pumping stations, a septic tank, dosing chamber and 12 sand filter beds, two of which are to be used as sludge beds. It is proposed to construct one pumping station and one unit of the disposal works at present.

This pumping station is the same in design and capacity as the first both as to arrangement and equipment. The pumps are to discharge the sewage into the septic tank and will operate under a static head of from 16 to 22 feet.

The septic tank which is covered has but one compartment, 125'x30' with 6' depth of flow, giving a liquid capacity of some 168,000 gallons and is sufficient to provide for about 8 hours' detention of sewage when serving a population of 5,000 persons on the usual assumptions as to sewage contributions. The tank has submerged inlets and outlets and the average velocity of flow through the tank will be about 3" per minute when treating sewage at the rate of 500,000 gallons per day.

Two sludge pipes are located near the outlet end of the tank which are provided with a blow-off valve so that the sludge and supernatant liquid can be discharged to the sludge beds by gravity when required. It appears that the sludge outlets could be placed near the inlets to better advantage inasmuch as the greater portions of the sludge is usually deposited near inlet of the tank.

From the septic tank the sewage passes into a small separate chamber 4' wide through 15 submerged outlets. From this chamber the sewage flows into a dosing chamber 50'x30'x4' deep, having a total capacity of about 45,000 gallons. Five plural alternating 14" siphons of the Miller type are located in a separate chamber 20'x10'x4' deep which communicates with the main chamber by means of four 18" openings. According to the report of the engineer the siphons are designed to empty the dosing tank in about 15 minutes.

The siphons discharge through 15" and 18" vitrified pipes to the 10 sand filter beds having a total area of 3.4 acres. These beds are provided with distributing systems but are not underdrained, it being assumed that the soil which consists of sand some 40 feet deep will be able to absorb the effluent. When treating sewage at the rate of 500,000 gallons per day the beds will be required to operate at a rate of 145,000 gallons per acre per day. The sewage disposal plant, if properly constructed and operated, should provide for a satisfactory means of caring for the sewage for a population up to about 5,000 persons on the usual assumption as to sewage contribution.

It appears, therefore, that the four units comprising the sewage disposal works to be constructed ultimately will care for a future population of some 20,000 persons.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design and of local and general requirements with respect to proper methods for the disposal of sewage from the proposed system of sewers it appears that the plans, with the exception of the screening chamber plans, are well designed in this respect and provide for a satisfactory means of sewage disposal.

With respect to the proposed sewer system, however, it appears that there are a few features of the plans which should be revised before final approval of the plans is given. There are, as indicated above, a few lines of sewers with flat grades and the system, including the outfall sewer, is not entirely adequate as to capacity, as noted above, to care for the probable future contribution on the usual assumptions as to population and water consumption

which gives rise to the sewage. I would recommend, therefore, that the plans be returned for amendment in accordance with the suggestions embodied in this report.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 28, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following suplementary report on an examination of amended plans for a proposed sewer system and sewage disposal plant for the village of Hempstead, Nassau county, resubmitted to this Department for approval on November 22, 1910.

The plans have been carefully examined by the Engineering Division and it appears that they have been revised in general accordance with the recommendations embodied in my report of November 7, 1910, on the examination of the original plans.

The flat gradients of some of the sewers criticised in my last report have been increased or the sizes of the sewers increased so as to give a minimum slope of 0.3 per cent. for the 8" sewers, 0.2 per cent. for the 10" sewers and 0.16 per cent. for 12" sewers. While these gradients are rather flat to insure self-cleansing velocities except when the sewers are flowing full or half-full, clogging can be prevented by proper flushing and attention.

The design of the system has been rearranged so that trunk sewers are to be constructed in the streets along the creek which has permitted the use of larger sewers on flatter grades than shown on the original plans.

The sizes of some of the main sewer lines tributary to the central pumping plant at Franklin street and Mill road have been increased so as to better care for the probable future contribution of sewage from the sections served by them on the usual assumptions as to population and water consumption giving rise to the sewage.

The size of the 18" outfall sewer from the end of the force main in Greenwich street to the sewage disposal works has also been increased to 20" so that this sewer will now care for a population of some 13,000 persons contributing sewage at a maximum rate of 300 gallons per day.

It appears, therefore, that the proposed sewer system should be adequate to meet the needs of the village for a considerable period in the future, assuming that in the construction the sewers be made sufficiently water-tight to prevent excessive infiltration of ground water.

The receiving manholes or screen chambers in connection with the pumping stations have been enlarged so as to form two compartments. Each compartment is provided with two inclined screens, 2'x4', composed of ½" rods spaced 1" apart on centers, giving a total screening area of 32 square feet at each pumping plant.

Although each compartment of the screen chamber is provided with valves at the inlet and outlet so that either one may be by-passed while cleaning, no platforms, however, are provided to receive the screenings and for the operator to stand on when raking the screens. It appears also that the screens are rather fine and will tend to clog quickly and require frequent cleaning, thereby increasing the cost of operation so that it may become necessary to replace them with somewhat coarser screens before the sewer system is fully developed.

The design of the sewage disposal plant has not been changed from that shown by the original plans.

It appears that the sewer system, pumping stations and sewage disposal plant if properly constructed and operated should provide satisfactory sewage facilities for the village of Hempstead for a reasonable period in the future and I would therefore beg to recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ILION

On October 31, 1910, plans for sewer extensions in the village of Ilion were submitted for approval by the sewer commissioners. These plans were approved on December 2, 1910, and a permit was issued allowing the discharge of sewage from the proposed sewers into the Mohawk river. This permit contains in addition to the usual revocation and modification clauses the following conditions:

1. That on or before January 1, 1912, detailed plans for settling, sedimentation or septic tanks to treat the sanitary sewage of the village of Ilion, which shall meet the requirements of this Department accompanied by general plans for additional or supplementary works for more complete treatment of the sewage, shall be submitted to this Department for approval.
2. That the said settling, sedimentation or septic tanks shall be constructed and put in operation by September 1, 1912.
3. That whenever required by the State Commissioner of Health detailed plans for said additional works for more complete treatment of the sewage of the village shall be submitted for approval and that any or all portions of said additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation when required by the State Commissioner of Health.

ALBANY, N. Y., *November* 18, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report of an examination of plans for proposed sanitary sewer extensions in the village of Ilion, Herkimer county, submitted to this Department for approval by the sewer commissioners on October 31, 1910.

The records of the Department show that plans for a comprehensive sewer system, pumping station and sewage disposal plant were approved on January 16, 1893. The plans showed that the proposed pumping station and sewage disposal plant consisting of a chemical precipitation plant were to be located near the West Shore railroad tracks and some 600 feet east of East street extended. It appears that the pumping station and chemical precipitation plant were never constructed.

On August 25, 1893, amended plans were approved showing changes of alignment of the outfall sewer and outlet and change of location of the sewage disposal plant to a point near the intersection of East street extended and the West Shore railroad, some 600 feet west of the location shown by the previous plans.

On January 16, 1894, amended plans for the sewer system for the village were approved by the Department. These plans provided for a change in the alignment, sizes and gradients of the sewers in the vicinity of River and Railroad streets and Brewery lane between the West Shore railroad and the Erie canal so as to eliminate the pumping plant at the intersection of Railroad and River streets and thereby change the entire sewer system of the village into a gravity system.

On February 13, 1902, plans for extensions to the sewer system were approved.

The report of the public sewer system made in accordance with section 79 of the Public Health Law, as amended by chapter 468 of the Laws of 1903, together with a plan showing all sewers constructed to date, were not submitted until April 15, 1904. This report shows that the total length of sewers in the system at that time was 12.41 miles and the estimated population served by the sewer system about 4,500. The population of the village in 1905, according to the State census, was 5,924.

The plans now submitted were prepared by James D. Ringwood, civil engineer of Ilion, and comprise duplicate tracings of plans of proposed sewer extensions and duplicate tracings of profiles of proposed sewers and streets.

These plans show that it is proposed to construct eight-inch sewers on grades varying from .34 per cent to 11.7 per cent. in Hakes road, Spring, Maple, McCann, Elm and Gordon streets.

Manholes are to be placed at all points of change of grade and alignment and flush tanks are to be located at the upper ends of Maple and Elm streets and Hakes road. The spacing of the manholes vary from 75 feet to 500 feet, but in no case are manholes to be placed at a greater distance than 500 feet apart.

The plans have been carefully examined in reference to sizes, grades and capacities in connection with the proposed sewers and it is found that the sewer extensions should be adequate as to size and capacity to satisfactorily care for the sanitary sewage of the district to be served by them on the usual assumptions as to population and to sewage contribution provided that in the construction the sewers be made sufficiently water tight to prevent excessive infiltration of ground water.

The urgent need for sewage disposal was pointed out in the report of the Consulting Engineer of the Department, dated October 27, 1892, on his examination of plans for sewerage for the village and in accordance with the resolution of the then State Board of Health revised plans including plans for the chemical treatment of sewage before discharging into the Mohawk were subsequently submitted for approval and reported upon under date of January 6, 1893. These revised plans were approved on January 11, 1893, but the sewage disposal works were never constructed as noted above. The discharge into the Mohawk river of untreated sewage from the village is therefore in direct violation of the Public Health Law and Village Laws.

The need for sewage disposal along the Mohawk river is becoming more and more urgent, and in view of the policy of this Department to eventually remove, as far as possible, all pollution of the waters of the State caused by the direct discharge of raw sewage and inasmuch as no plans for sewerage are being approved that do not provide for some means of sewage disposal, especially where public water supplies are involved, the village of Ilion should at this time be required to provide for the treatment of its sanitary sewage at an early date.

I am of the opinion, however, that the village should not be required to construct the rather expensive and antedated chemical precipitation plant provided for by the plans approved on January 11, 1893, inasmuch as a properly constructed and operated settling, sedimentation or septic tank will give practically as satisfactory results as those obtained by means of chemical precipitation, and the cost of operation in the case of chemical precipitation is much greater than by either of the other means of preliminary treatment owing to the added cost of chemicals and the additional amount of sludge to be cared for.

While it may not be necessary for the village to provide immediately for complete purification of the sewage that is now being discharged into the Mohawk river, steps should be taken to provide for at least settling, sedimentation or septic tank treatment at an early date.

I would therefore recommend that the plans now before the Department be approved and a permit issued allowing the discharge into the Mohawk river of sewage to be collected by the proposed sewers and that the permit contain in addition to the usual modification and revocation clauses, the following provisions:

1. That only sanitary or domestic sewage and no surface or storm water from streets, roofs or other areas shall be admitted to the proposed sewers.
2. That on or before January 1, 1912, detailed plans for settling, sedimentation or septic tanks to treat the sanitary sewage of the village of Ilion, which shall meet the requirements of this Department, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage, shall be submitted to this Department for approval.
3. That the said settling, sedimentation or septic tanks shall be constructed and put into operation by September 1, 1912.

4. That whenever required by the State Commissioner of Health detailed plans for said additional works for more complete treatment of the sewage of the village shall be submitted for approval and that any or all portions of said additional or supplementary works for more complete treatment of the sewage shall be constructed and put in operation when required by the State Commissioner of Health.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

JOHNSTOWN

On May 2, 1910, plans for a proposed intercepting sewer in the city of Johnstown were submitted for approval by the city engineer on behalf of the common council. These plans were approved on June 15, 1910, and a conditional permit issued allowing the discharge, into Cayadutta creek, of sewage to be collected by the proposed sewer.

On June 29, 1910, plans for a proposed sewer extension in Grove street were submitted for approval. The plans were approved on July 26, 1910, and a permit was issued allowing the discharge of sewage from the proposed sewer into Cayadutta creek.

Plans for a proposed sewer extension in East State street were approved on August 20, 1910, and a permit issued allowing the discharge of sewage from the proposed sewer in Cayadutta creek.

On August 23, 1910, plans for an extension of the intercepting sewer were submitted for approval. These plans were not satisfactory inasmuch as the capacity of the proposed sewer was considerably smaller than that portion of the intercepting sewer above the proposed extension and the plans were therefore returned to the city engineer for amendment with the request that preliminary plans be submitted showing a tentative location of the proposed sewage disposal site together with a profile of proposed route of a sewer from Montgomery street to such disposal site. These plans were amended in accordance with the recommendations of the Department and were resubmitted for approval on November 21, 1910. The revised plans were approved on December 2, 1910, and a conditional permit was issued allowing the discharge into Cayadutta creek of sewage from the proposed sewer.

The permits issued to the common council of the city of Johnstown during the past year contain the condition that on or before June 1, 1911, complete detailed plans, satisfactory to this Department, for the purification of the entire sanitary sewage of the city shall be submitted for approval; and that the construction of any or all portions of the sewage disposal works shown by said plans shall thereafter be undertaken when required by the State Commissioner of Health and be completed within the time limit set by said Commissioner.

ALBANY, N. Y., *June* 15, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report of the examination of plans for a proposed intercepting sanitary trunk sewer in the city of Johnstown, Fulton county, submitted to this Department for approval by the city engineer on behalf of the common council on May 2, 1910.

The city of Johnstown has a population of about 10,000 and is located in the south central part of Fulton county near the Montgomery county boundary line. It is situated on both sides of Cayadutta creek, which meanders through the city in a southerly direction and empties into the Mohawk river at Fonda, a distance of about seven miles below Johnstown measured along the stream. The creek has a fall of about 400 feet in that distance.

The water supply of the city is furnished by the municipality which owns the entire watershed.

The records of the Department show that the construction of the sewer system commenced in 1876 and although extensions of this system have been made from time to time until at present practically the entire population is served by sewers, none of these extensions have been submitted for approval or approved by this Department. All but a small portion of the existing sewers are constructed on the separate plan and discharge into Cayadutta creek within the city limits.

The plans and documents now under consideration were submitted in person by the city engineer and city attorney and consist of duplicate copies of each of the following:

1. A general plan showing the alignment of sewers constructed to date in the city.
2. A general plan for a proposed intercepting sewer with discharge into Cayadutta creek in the lower end of the city, comprising:
   (a) A general plan of intercepting sewer.
   (b) Profile of intercepting sewer.
3. Report and application signed by the city attorney.
4. One copy of specifications.

A duplicate set of blue-prints of plans for sewers recently constructed by the city were later submitted in order to facilitate the examination of the plans now before the Department.

The proposed intercepting and trunk sewer is to extend along Cayadutta creek from the existing 24-inch sewer near Market street to Montgomery street, a distance of 4,750 feet, and is to consist of 24-inch and 30-inch vitrified tile and iron pipe sewers, the latter to be used where the sewers are to be laid in trenches in the bottom of the creek. This precaution should tend to reduce the infiltration of ground water or creek water to a minimum if proper care is taken during construction to secure tight joints. Manholes are to be located at intervals not exceeding 500 feet.

The proposed trunk sewer will intercept all but one of the sewers which now discharge into Cayadutta creek and the outlet of this sewer as well as that of the proposed trunk sewer is below the series of ponds in the western part of the city which are at present polluted by sewage.

The plans have been carefully examined in regard to sizes, grades, velocities, capacities and other hydraulic and sanitary features in connection with the intercepting sewer and it is found to be sufficient to meet the probable future requirements for sanitary sewage of the district to be served upon the usual basis of population and water consumption, and assuming that in the construction the sewers will be made sufficiently water tight to prevent excessive infiltration of ground water. It appears, however, that considerable saving could be effected by reducing the size of the proposed sewer from 30″ to 24″ between stations 24 + 04 and 29 + 29, a distance of 725 feet, inasmuch as 225 feet of this section is to be of iron pipe. This reduction in size can safely be made since a 24″ sewer on a 1.48 per cent. grade has a greater carrying capacity than the sewer below this section which is to be 30″ in diameter and have a grade of 0.3 per cent.

It will be noticed that the plans make no provision for any method of sewage purification, the contemplated improvements involving merely the interception of the sewage and conveying it to a point below the city where no nuisance will be created affecting the citizens of Johnstown. In order to determine the extent of pollution of Cayadutta creek above and through the city as a result of the discharge of sewage of not only Johnstown but the city of Gloversville, and to secure other information that might have a bearing upon the requirements for sewage disposal in the case of Johnstown, I visited the city on May 16, 1910, and made an examination of the creek through the city.

It appears that above the discharge of the intercepting sewers just below Market street Cayadutta creek is comparatively clean and apparently no nuisance would be created in this section of the stream during any season. Below the discharge point of this 24″ sewer, however, the stream is seriously

fouled and was not only a nuisance at the time of my visit but unquestionably would be one to a worse extent during the summer season.

Just below the Fonda, Johnstown and Gloversville railroad the old canal enters Cayadutta creek. This canal is covered for a portion of its distance through the city and into it is discharged the sewage of Gloversville some two miles above. Consequently below the intersection of the canal with Cayadutta creek the combined pollution of Gloversville and Johnstown produces a condition of sewage pollution that is hardly if at all exceeded anywhere in the State. It should be noted, however, in this connection that the city of Gloversville has authorized the construction of a sewage disposal plant and that when the construction of this plant is completed the sewage pollution of this canal water will be removed, thus leaving in Cayadutta creek the pollution from Johnstown only.

It is therefore quite important for the city of Johnstown, owing to the serious nuisance that exists along this stream on the greater portion of its course through the city, that the sewage now discharged into the stream should be intercepted and carried below the city. It is likewise important that suitable provision should be made for sewage purification, either at the present time or in the very near future. The city of Gloversville has already undertaken to purify its sewage for the benefit of the city of Johnstown and riparian owners, and it appears that these plans will be executed within a reasonably short time. There is no legitimate reason why the city of Johnstown should not do the same thing for the benefit of riparian owners below Johnstown. There is, however, an important difference between the conditions below the city of Gloversville and those existing below the city of Johnstown, namely: that below the city of Gloversville the health and comfort of a very large community is immediately affected, whereas below the city of Johnstown a relatively few riparian owners live along this stream between the city and its junction with the Mohawk river.

In consideration of the important distinction above pointed out in regard to the two cities, the further fact that a very necessary relief is immediately needed in the city of Johnstown from the present sewage pollution of this stream and the nuisance resulting from it; the limited funds available for sewerage improvements at the present time by the city, that the construction of disposal works for the purification of the sewage of the city might be temporarily deferred under certain conditions cited below; although no special study has been made by the city engineer or other person, to my knowledge, as to the feasibility, type or proper location for disposal works below the city, it appeared from my inspection of the land that there was sufficient fall and the requisite area somewhere available below the city for the construction of suitable methods of sewage disposal.

Since the plans for the proposed system of intercepting sewers are suitable from an engineering standpoint as pointed out above, and notwithstanding the lack of detail study as to the exact method and location of suitable works for the disposal of the sewage, it is from my inspection, easily possible to design these works for the economical and satisfactory disposal or purification of the sewage from this system when necessary, I should recommend on the grounds of immediate relief from present insanitary conditions in the city, that these plans be approved and a permit be issued for the discharge of sewage at proposed outlet upon the conditions: that, satisfactory plans be submitted by the city within one year providing for the purification of the sewage of the entire city and that whenever in the opinion of the Commissioner it shall become necessary, the construction of any or all of said sewage disposal plant shall be undertaken and completed within the time limit set by him.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *July* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for a proposed sewer extension in the city of Johnstown, Fulton county, submitted to this Department for approval by the common council on June 29, 1910.

The plans show that it is proposed to construct an eight-inch sanitary sewer in Grove street from Mill street 250 feet west. The topography of Grove street is such that this sewer will probably never be extended and is therefore adequate as to size and capacity for future requirements for the conveyanc of sanitary sewage provided that in construction the sewer is made sufficiently water tight to prevent excessive infiltration of ground water.

Plans were recently approved by this Department for the construction of an intercepting sewer in the city of Johnstown and the permit issued by this Department for the discharge into Cayadutta creek of sewage to be collected by this sewer required that on or before June 1, 1911, complete detailed plans, satisfactory to this Department, for the purification of the entire sanitary sewage of the city shall be submitted for approval.

Therefore the question of the disposal of sewage need not be considered in connection with the plans now before the Department for approval inasmuch as this matter was carefully considered in my report of June 15, 1910, on the examination of plans for the construction of the intercepting sewer approved by you on that date.

I beg to recommend that the plans be approved and a permit issued allowing the discharge of sewage to be collected by the proposed sewer into Cayadutta creek.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *August* 19, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for a proposed reconstruction and extension of the present sewer in East State street in the city of Johnstown, Fulton county, submitted to this Department for approval by the city engineer on behalf of the common council on August 13, 1910.

The plans show that it is proposed to reconstruct some 250 feet sewer in East State street easterly from Chase street on a slope of 0.5 and to extend this sewer on the same slope for a distance of about 560 feet beyond the end of the existing sewer. The total length of this sewer will be 810 feet and owing to the topography of this street the proposed sewer will probably not be extended in the future.

The sewer is found to be adequate as to size and capacity to meet the probable future requirements for sanitary sewage for the district to be served by it, assuming that in the construction the sewer is made sufficiently watertight to prevent excessive infiltration of ground water.

The sewer, however, should be provided with an intermediate manhole in order to facilitate cleaning and inspection. The distance between manholes should not be greater than 500 feet and the proposed sewer is to be 810 feet with no manholes except at the upper and lower ends of the sewer.

The question of sewage disposal for the city was carefully considered in my report of June 15, 1910, on the examination of plans for the proposed intercepting sewer and need, therefore, not be taken up in connection with the present plans.

I would recommend that the plans be approved and a permit be issued allowing the discharge into Cayadutta creek of sewage to be collected by the proposed sewer on the condition that an intermediate manhole be inserted on

the line of this sewer. I would also recommend that the permit contains the provision as to the future disposal of sewage of the city of Johnstown embodied in the permit issued to the common council, June 15, 1910.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *September* 28, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for a proposed extension of the intercepting sewer along Cayadutta creek in the city of Johnstown, Fulton county, submitted to this Department for approval by the city engineer on behalf of the common council on August 23, 1910.

Plans for a 30" intercepting sewer for the city were approved on June 15, 1910. This sewer extended from Market street to Montgomery street along Cayadutta creek, a distance of some 4,600 feet. All but one of the outfall sewers of the city which formerly discharged into the creek at various points within the city limits are to be intercepted by this sewer. These plans also provided for a tentative extension of this sewer on a 0.30 per cent. grade.

The plans now under consideration show that it is proposed to extend this 30" intercepting sewer from Montgomery street southerly along Cayadutta creek for a distance of about 700 feet. This additional extension will intercept a 12" sewer, known as the Madison avenue outfall sewer, below Montgomery street.

According to the plans it is proposed to construct this sewer from station 46+30 to station 53+05 on a slope of 0.15 per cent. While this slope is adequate to give self-cleansing velocities in a sewer of this size it does not appear that the capacity of this sewer on a slope of 0.15 per cent. will be adequate to care for the sewage of the city when fully developed on the usual assumptions as to population and sewage contribution and the basis of computation used in passing upon the plans for that portion of the intercepting sewer above Montgomery street, approved on June 15, 1910.

Although the proposed extension will be required to care for considerably more sewage than the intercepting sewer above Montgomery street the capacity of the former will be only two-thirds that of the latter.

It will be necessary, therefore, to either increase the size of the proposed extension or to increase the slope to at least 0.30 per cent. so that the capacity of this section will be at least equal to that of the intercepting sewer above the proposed extension, thereby better balance the design of the intercepter for the entire distance and make it more adequate and meet the probable future requirements of the city. It may be possible to utilize a portion of the 13.79 feet of head lost in the 51 feet of sewer between stations 45+79 and 46+30 to increase the slope of the section of the proposed extension now under consideration as well as in the case of future extensions of this sewer.

It appears that at this time before any plans for extensions to the intercepting sewer are approved by this Department tentative or preliminary plans showing a profile and proposed route to the disposal plant site should be submitted in order to show the feasibility of further extending this sewer and conveying the sewage to the proposed disposal plant by gravity.

I, therefore, beg to recommend that the plans be returned to the city engineer for amendment, in accordance with the above suggestions, and that he also be requested to submit tentative or preliminary plans showing the probable location of the sewage disposal plant, together with a profile of the proposed route of the outfall sewer to such sewage disposal plant.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 26, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of amended plans for a proposed extension of the intercepting sewer along Cayadutta creek in the city of Johnstown, Fulton county, resubmitted to this Department for approval by the city engineer on November 21, 1910.

The plans have been revised in accordance with the recommendations embodied in my report of September 28, 1910, and show that it is proposed to extend the 30″ intercepting sewer on a slope of 0.3 per cent. along Cayadutta creek southerly from Montgomery street to a temporary outlet into this creek, a distance of some 700 feet.

A preliminary plan has also been submitted which shows that it is possible to extend the intercepting sewer on a slope of .3 per cent. along the southerly bank of Cayadutta creek to a proposed disposal site near the iron bridge some 4,000 feet from the end of the sewer extension now under consideration and, according to the city engineer, this site has an area of 4.6 acres, and the elevation of the intercepting sewer at the disposal site is 20 feet above the creek. It appears, therefore, that it is possible to convey by gravity flow the entire sanitary sewage of the city of Johnstown to a suitable site for disposal works about three-quarters of a mile beyond the city limits.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the temporary discharge of sewage into Cayadutta creek about 700 feet below Montgomery street and that the permit contain in addition to the usual revocation and modification clauses the following provisions:

1. That the proposed sewer extension shall be constructed in complete accordance with the plans approved this day.
2. That on or before June 1, 1911, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city shall be submitted for approval; and that the construction of any or all portions of the sewage disposal works shown by said plans shall thereafter be undertaken when required by the State Commissioner of Health and be completed within the time limit set by said Commissioner.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

LESTERSHIRE

On July 14, 1910, plans for sanitary sewer extensions in Lewis street and Jenison avenue were submitted for approval. Application made by the board of trustees of the village for the approval of these plans was received on July 18, 1910. The plans were approved on August 16, 1910, and a permit was issued allowing the discharge into the Susquehanna river of sewage from the proposed sewers.

On September 29, 1910, application was made by the board of trustees for the approval of plans for a proposed sewer in Main street. These plans were approved on October 21, 1910, and a permit was issued allowing the discharge into the Susquehana river of sewage from this sewer.

ALBANY, N. Y., *August* 12, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—I beg to submit the following report on the examination of plans for sanitary sewer extensions in the village of Lestershire, Broome county, submitted to this Department for approval by the board of trustees on July 14, 1910.

The records of the Department show that original plans for a comprehen-

sive sewer system and sewage disposal plant were approved on February 27, 1903, and amended plans were approved on October 4, 1904. Permits for extensions to the sewer system have been issued from time to time since the year 1904. On February 7, 1906, a permit was issued on the condition that the sewage disposal plant be put in operation within two years of that date. On April 10, 1908, this permit and the one issued on October 30, 1907, were extended until such time as the State Commissioner of Health shall require the construction of the sewage disposal plant.

The plans now under consideration show that it is proposed to construct some 700 feet of 6" and 8" sanitary sewers in Jenison avenue and Lewis street which are to discharge into the existing sewer in Willow street at the intersection of this street and Lewis street. The plans also show that it is proposed to construct the sewer in Lewis street on a straight alignment from a manhole in Jenison avenue to a manhole on the east line of Willow street at which point the alignment changes so as to connect with the sewer in Willow street on a steep grade at right angles to this sewer.

This is not a good arrangement and in order to facilitate cleaning and inspection the sewer in Lewis street should be continued on a straight alignment from the proposed manhole at the intersection of Jenison avenue and Lewis street to the present sewer in Willow street where a drop manhole could be constructed on the line of this sewer. Such an arrangement would cost but very little more, if any, than that shown on the plans now before the Department.

The proposed sewer extensions have been carefully examined as to sizes, grades and capacities, and it is found that they are adequate, if properly constructed, to meet any probable demand that may be made upon them in the future.

I, therefore, recommend that the plans be approved and a permit issued allowing the discharge of sewage to be collected by the proposed sewers into the Susquehanna river through the existing outlet on condition that a manhole be constructed at the intersection of the proposed sewer and the existing sewer in Willow street.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *October* 18, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for a proposed amendment to plans for the sewer system of the village of Lestershire, Broome county, submitted to this Department for approval by Mr. S. Foster Jaques, consulting engineer of the city of Binghamton, on behalf of the board of trustees, on September 29, 1909.

The question of sewerage and sewage disposal of the village was discussed in my report on an examination of plans dated August 12, 1910, to which reference is made, and this matter will, therefore, not be considered at this time.

The plans for sewerage and sewage disposal for Lestershire, approved by this Department on February 27, 1903, provided for an 8" and 10" sewer in Main street that would drain west from Baldwin street.

The plans now under consideration show that it is proposed to construct this sewer in Main street so that it will drain east from St. Charles street to Baldwin street, a distance of some 800 feet, and beyond Baldwin to Arch street. The sewer is to have a slope of from 0.3 per cent. to .35 per cent.

It is stated in the report of the designing engineer that the section of Main street west of St. Charles street is sparsely settled and will not require sewerage facilities for years, but that it is desired to lay a sewer in that portion of Main street east of St. Charles street before paving Main street, which is the business street of the village.

The plans have been carefully examined in reference to sizes, slopes, capacities and other hydraulic and sanitary features, and it is found that the pro-

posed sewer is adequate for future requirements for sanitary sewage for the section to be served by it, assuming that in construction the sewer will be made sufficiently water-tight to prevent excessive infiltration of ground water.

In conclusion, I would state that the proposed change in the direction of flow of sewage in the section of Main street under consideration does not materially change the original design, and in view of this and the adequacy of the proposed sewer I beg to recommend that the plans be approved and a permit issued allowing the discharge of sewage to be collected by this sewer into the Susquehanna river.

Very respectfully,
THEODORE HORTON,
Chief Engineer

LETCHWORTH VILLAGE

On July 22, 1910, plans for water supply, sewerage and sewage disposal for Letchworth village were submitted to the Department for approval by the State Architect, in accordance with the provisions of section 14 of chapter 49 of the Laws of 1909, the "Public Health Law," constituting chapter 45 of the Consolidated Laws. These plans were approved on July 27, 1910.

ALBANY, N. Y., *July* 26, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for water supply, sewerage and sewage disposal for Letchworth Village, Thiells Station, Rockland county, submitted to the Department for approval by the State Architect on July 22, 1910.

According to the State Architect the institution is to be established for the purpose of caring for feeble-minded and idiots and will provide for an ultimate population of 3,000 persons, consisting of about 2,500 patients and 500 employees. The daily per capita water consumption is estimated at 125 gallons based upon water consumption of similar institutions, making a total of 375,000 gallons per day to be provided for.

The water supply is to be taken from the middle branch of Minisceongo creek. This supply was recommended to the commission appointed to select a site for the institution by Mr. Emil Kuichling who, together with Mr. G. C. Whipple, went over the watershed of that part of Minisceongo creek which lies above the proposed site.

According to Mr. Kuichling's report to the chairman of the Commission, "various samples of water were closely examined in the field, and three were taken to Mr. Whipple's laboratory for chemical and bacteriological analysis." Mr. Whipple, in his report to Mr. Kuichling, dated October 30, 1907, on the result of their inspection and analyses, states that "the water of the middle branch would not need filtration, as the color is low and the watershed almost uninhabited. If properly stored, it would make an excellent supply. One of its most attractive qualities is its extreme softness."

Mr. Kuichling also states in his report that by constructing an impounding reservoir of about 25,000,000 gallons storage capacity at an elevation of about 700 feet above tide level the institution "would secure an abundant supply of pure and very soft water, delivered by gravity at a sufficient pressure or head to throw copious streams for fire service directly from the hydrants over any of the buildings." A storage capacity of 25,000,000 gallons is equivalent to a uniform daily supply of 250,000 gallons during 100 consecutive days of absolute drought.

According to the report of the State Architect and plans now before the Department for approval it is proposed to construct a dam to intercept the middle branch of Minisceongo creek so as to give a total drainage of about three square miles and form an impounding reservoir of some 21,000,000 gallons capacity. The elevation of the crest of the spillway is 682 feet above tidewater level.

The dam has been designed under the direction of the Deputy State Engineer and Surveyor. The bottom of the reservoir, which is composed largely of rock and clay, is to be cleared and grubbed together with whatever stripping of loams may be found necessary.

A 12" distributing pipe will be carried under the dam from the gatehouse to manhole below the dam where this pipe will be divided into two 8" distributing pipes which are to be provided with blowoff valves, air valves at different intervals along the lines. These two 8" water pipes which will have a capacity of 600,000 gallons per day, each with a pressure head of about 150 feet at the buildings, loop the central portion of the institution grounds.

The plans show that it is proposed to construct only the trunk sewers at present. The system of sewers also includes two pipe siphons, 6" and 10" in diameter across the creek, which are provided with screens and flushing connections with the water supply system. The plans have been carefully examined with respect to sizes, capacities, grades and other hydraulic features in connection with the proposed sewers and it is found that they are adequate to care for the sanitary sewage for the institution on the basis of population and water consumption used, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excessive infiltration of ground water.

The sewage will be conveyed by gravity to the proposed sewage disposal plant, consisting of settling tanks, sprinkling filters, settling basins, and sludge tank and sludge bed.

The ultimate design provided for seven settling tanks with hopper shaped bottoms for the depositing and collection of sludge. The settling tanks have a combined capacity to give about six hours' detention of sewage for the ultimate conditions for which the plant is designed. It is proposed to install about one-half of this plant at present.

Each hopper of the settling tank is provided with a force pipe and valve by means of which the accumulated sludge is discharged into a sludge tank where the heavier materials tend to settle to the bottom and the liquid is discharged through a siphon to sludge beds. The heavy sludge in the sludge tank is conveyed to trenches at the sludge disposal field.

There are two dosing tanks connected with the settling tanks, the smaller one is provided with a 6" discharge siphon and the larger tank, which has a capacity equal to two times the smaller tank, is provided with a 10" siphon. Although both of the dosing tanks are to be constructed with the first installation the larger tank will not be used until whole plant is constructed.

Under the average contribution of sewage for the ultimate population the large dosing tank will be filled about every twelve minutes, and it will take about one minutes to discharge each dose.

The effluent from the settling tanks are to be discharged to a sprinkling filter filled with broken stone to a depth of 5' 6" and designed to operate at a rate of about 1,900,000 per acre per day. The filtrate is to be collected by underdrains which discharge into settling basins and then into Minisceongo creek through a submerged outlet. The ends of the underdrains are connected with riser pipes for the purpose of ventilation.

A uniform distribution of the settling tank effluent is effected by means of nozzles of the square distribution type in connection with dosing tanks having a varying cross section.

The sewage disposal plant, if properly constructed and operated, should produce a satisfactory effluent.

It appears from a careful examination of the plans, in connection with the data furnished by the State Architect's report and the report of the Commission appointed to select a site, that the plans provide for an adequate and satisfactory water supply, sewer system and sewage disposal works for the future requirements of the institution on the basis of population and water consumption used in the design.

I, therefore, recommend that the plans be approved.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

LONG BEACH

On January 31, 1910, plans for a proposed sewer system and sewage disposal plant for Long Beach were submitted for approval. The plans were returned for amendment and additional information and were finally resubmitted for approval on February 15, 1910. The plans were approved on March 16, 1910, and a permit issued allowing the discharge into Broad or Long Beach channel of effluent from the proposed sewage disposal plant. This permit contains, in addition to the usual revocation and modification clauses, the conditions that the effluent shall be discharged into the channel only during the periods of ebb tide but not within two hours of the time of low tide; that no sewage sludge shall be discharged into Broad or Long Beach channel; and that whenever required by the State Commissioner of Health arrangements shall be made to effectually sterilize or disinfect the effluent or additional works shall be constructed for more complete treatment of the sewage than that provided for by the proposed plans.

ALBANY, N. Y., *March* 7, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for the proposed sewer system and sewage disposal plant for Long Beach, Long Island, submitted to this Department for approval by Charles W. Leavitt, Jr.

These plans were first submitted for approval on January 31, 1910, but owing to deficiencies in certain features of design and a lack of sufficient and definite data as to the methods of operation, the plans were returned for amendment and additional information on February 5th. Revised plans, together with a supplementary report, were resubmitted for approval on February 15, 1910.

Long Beach is an island located in the town of Hempstead, south of Long Beach channel, and has an area of about 2,000 acres. About 600 acres of the western portion of this island is being developed as a summer resort, and this constitutes about one-half of the entire area to be improved in the near future for the use of the proposed summer colony.

The plans show that it is proposed at present to provide sewerage facilities for the central and eastern portion of the section undergoing development, and the report of the designing engineer states that the future population of this area is estimated at 5,000 persons. The lateral sewers are to be 8" in diameter in the east and west streets, draining through alternate north and south streets by gravity through 8 and 10" sewers to the main sewer which is to have a diameter of from 20 to 30". Flush tanks are to be installed at the ends of all lateral sewers. Owing to the level surface of the ground pumping stations are to be located at different points along the line of the main intercepting sewer for the purpose of raising the sewage to different levels and allow it to flow by gravity from one station to the next.

The plans have been carefully examined by the engineering division in regard to grades, sizes, velocities, capacities and other hydraulic and sanitary features in connection with proposed sewers, and they are found to be sufficient to meet the future requirements of this district upon the basis of population used, and assuming that in the construction the sewers shall be made sufficiently watertight to prevent excess leakage. The plans for the trunk and lateral sewers provide for sanitary sewage only and, it is understood, in the development of all branch and lateral sewers, which will discharge into this interceptor in the future, that additional plans for this shall be submitted for approval by this Department.

According to the plans the sewage disposal plant is to consist of a settling tank and storage tank. The settling tank is divided into three compartments and the sewage is to flow from one compartment to the other through submerged orifices. The total capacity of the settling tank is sufficient to give about six hours' detention of sewage on the basis of 5,000 persons and an average rate of water consumption of 100 gallons per capita per day.

From the last compartment of the settling tank the sewage is to pass into a storage tank large enough to retain the maximum contribution of sewage for a period of eight hours, on the assumption that three-fourths of the sewage will reach the disposal plant in twelve hours.

It appears from the report of the designing engineer that it is proposed to discharge the effluent from the storage tank at high tide and allow a continuous flow to within two hours of low tide when the outlet valve will be closed and the effluent stored for eight hours until the next high tide. The effluent pipe extends into the channel some 100 feet to deep water where it is divided into several branches in order to better facilitate dispersion. Sludge from the settling tank is to be disposed of in sand pits adjacent to the disposal works.

There has been considerable correspondence between the designing engineer and this Department since the plans were first received as to a possible change of location of the disposal plant to a more suitable site to the west, embracing a more complete purification of the sewage owing to the location of important oyster beds in the waters wherein it is proposed to discharge the effluent from the disposal works. It was suggested that on account of the possibility of the settling tank effluent returning to the inner harbor on the flood tide due to improper operation of the disposal works or other causes the effluent should either receive supplementary purification on natural sand filter beds following treatment in contact or sprinkling filters, or be treated on sand filters without the use of preliminary filters.

It was learned, however, from the designing engineer that the land to the westward is in litigation and, therefore, not available for this purpose at present. It was further pointed out that the proposed installation of the sewage disposal plant as designed is to be used for two or three years only or until such time as it will be possible to secure land and extend the sewers to the west end of the island, where it could be more efficiently treated, or to provide other satisfactory means of purification. Permission was, therefôre, asked to allow the temporary discharge of settling tank effluent from the proposed sewage disposal plant at the point shown upon the plans.

In view of the above and of the apparent urgent need for sewerage facilities, I beg to recommend that the plans be approved and a permit be issued allowing the temporary discharge of effluent from the proposed sewage disposal plant containing, in addition to the usual modification and revocation clauses, the following conditions:

1. That whenever required by the State Commissioner of Health, and upon due notice from him, arrangements shall be made to effectually sterilize or disinfect the effluent to be discharged from the sewage disposal plant, or additional works shall be constructed for more complete treatment of the sewage than that provided by the plans; such sterilization or more complete treatment to be accomplished in accordance with plans which shall be submitted to and approved by the State Commissioner of Health.

2. That the length of time after due notice of revocation, as specified by section 79 of the Public Health Law, within which the discharge of sewage effluent shall cease shall be two months, unless otherwise stated in such notice.

3. That the effluent from the proposed disposal plant shall be discharged into the channel only during the period of ebb tide, but no such discharge shall be caused during these periods within two hours of the time of low tide.

4. That no sewage sludge shall be discharged either into the waters of Broad or Long Beach channels or where they may pollute the same or other waters tributary thereto or connected therewith, but shall be disposed of by burying in trenches as specified in the designing engineer's report accompanying the plans or by other means or methods approved by this Department.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

MEDINA

On January 4, 1910, application was received from the board of sewer commissioners of the village for the approval of a proposed amendment to the plans for sewers in the West Side sewer district. These plans were approved on January 8, 1910.

Albany, N. Y., *January* 8, 1910.

To the Board of Sewer Commissioners, Medina, N. Y.:

Gentlemen: — In response to the application, contained in a resolution adopted by your board on December 30, 1909, for my approval of a proposed amendment to the plans for proposed sewers in the West Side sewer district in the village of Medina, approved on November 15, 1909, I hereby approve such amendment and change, to wit:

A change in the diameter and gradient of the trunk sewer in said sewer district from Center street to Prospect avenue from a diameter of 20 inches and a gradient of 0.4 per cent., as shown on the approved plans, to a diameter of 22 inches and a gradient of 0.275 per cent., as shown on a profile sheet submitted to this Department on December 31, 1909.

The above approval is duly given this 8th day of January, 1910, in accordance with section 260, article 11 of chapter 64 of the Consolidated Laws, the Village Law, subject to the provisions of a permit issued on November 15, 1909.

ALEC H. SEYMOUR,
Acting Commissioner of Health

MONROE COUNTY TUBERCULOSIS HOSPITAL

On January 24, 1910, plans for a sewage disposal plant for the proposed Monroe County Tuberculosis Hospital were submitted for approval by the board of supervisors of Monroe county. These plans were approved on March 1, 1910.

Albany, N. Y., *January* 26, 1910.

Eugene H. Porter, M.D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir: — I beg to submit the following report on an examination of plans for the proposed sewage disposal plant for the Monroe County Tuberculosis Hospital submitted to this Department for approval on January 24, 1910.

The proposed hospital is to be located just outside the city limits of Rochester and the report of the designing engineer states that it is designed to accommodate 100 persons, including patients, attendants and officers. A per capita rate of water consumption of 100 gallons per day is assumed in the design, based upon the rates used in similar institutions in the State.

The sewage disposal works consists of a settling tank, three sand filters and a sludge bed. The settling tank is divided into three compartments by transverse division walls forming a grit and screen chamber, sedimentation compartment and dosing chamber. The settling tank has a sedimentation capacity equivalent to about ten hours' detention of sewage for an average daily contribution of 10,000 gallons.

The sedimentation compartment is to be built with a double hopper bottom for the accumulation of sludge which can be discharged to an adjacent sludge filter through two 4-inch blow-off pipes extending to within three inches of the bottom of the hoppers. The grit and dosing chambers are also provided with

similar blow-off pipes leading to the sludge bed so that the entire tank can be cleaned without emptying.

The settling tank effluent passes into the dosing chamber provided with three 6-inch alternating dosing siphons for discharging the contents of the chamber upon three intermittent sand filters in rotation. These filters are three feet deep, properly underdrained, and have a combined average area of about 0.1 acres. At the assumed rate of contribution the beds have sufficient area to treat settled sewage at the rate of 100,000 gallons per acre daily.

The plans have been carefully examined by the Engineering Division and the sewage disposal plant is found to be well balanced and shows evidence of careful study and design. A satisfactory and nonputrescible effluent should be produced by this plant if properly constructed and operated. The capacity, moreover, is adequate to meet the present needs of the institution and allow for a reasonable increase in the future.

Respecting the design of the vitrified sewer to convey sewage from the hospital to the disposal plant, however, it should be noted that the final section, 350 feet long, is designed to act as an inverted siphon from manhole No. 4 to the screening chamber.

This feature of the design is likely to prove unsatisfactory, owing to the probability of grease deposits induced by fluctuations of the elevation of sewage in the settling tank and in this siphon and owing to the usual tendency to deposition of solid matters in siphons and the consequent stoppage of the sewer.

If this entire section of sewer were located to the southward, the gradients of the last two sections of sewer flattened so that the inlet to the tank should enter at elevation 529 or above and connect with a tee or a cross with a vertical pipe from this tee or cross reaching nearly to the bottom of the screening chamber, the result would be that the unsatisfactory section of inverted siphon would be eliminated, ready access for inspection and cleaning of the portion of the inlet pipe below the elevation of sewage in the tank would be had and a comparatively small amount of embankment over the sewer would be required.

I, therefore, beg to recommend that the plans be approved on condition that the inverted siphon be eliminated in a manner similar to that described above.

Respectfully submitted,
THEODORE HORTON
Chief Engineer

MONTICELLO

On June 1, 1910, plans for an amendment to the plans for sewage disposal for the village of Monticello, which were approved on December 16, 1909, were submitted for approval by the board of sewer commissioners. These plans were approved on June 15, 1910, and a permit was issued allowing the discharge into Cold Spring brook of effluent from the proposed sewage disposal plant.

ALBANY, N. Y., *June* 13, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on the examination of amended plans for sewage disposal for the village of Monticello, Sullivan county, submitted to this Department for approval on June 1, 1910.

According to the records of the Department, plans for sewerage and sewage disposal for Monticello were approved on December 16, 1909. The proposed sewage disposal plant was to consist of settling tank, contact beds and natural irrigation or filter beds.

The amended plans and documents recently submitted comprise the following:

1. Duplicate reports and specifications.

Tracings and prints of:

2. Topographical map showing alignment of a portion of the sewer system and the new location of the sewage disposal plant.
3. Amended plan of sewage disposal works.
4. Plan of former sewage disposal plant to be superseded.
5. Profile of main outfall sewer.

The plans now under consideration show that it is proposed to change the location of the sewage disposal plant to a site some 1,200 feet to the southwest and up-stream on Cold Spring brook from the site shown upon the plans approved last December. It is stated in the application for the approval of the amended plans that the change in location of the plant is necessitated by the inability to secure a site at the point shown by the approved plans.

While the general arrangement of the different parts of the disposal plant has been changed to suit the new conditions of topography of the changed location, the capacity of the plant is the same as that shown by the former plans.

The approved plans proposed to divide the irrigation field into three units, one having a superficial area of two acres and two units of about one acre each. The present plans show that it is proposed to divide the field into four units of about one acre each. The amended plans also provide for a somewhat different method of applying the sewage to the contact beds as well as a field for the disposal of sludge adjacent to the proposed irrigation field.

The new location of the proposed disposal plant seems to be more suitable for a disposal site than the former, inasmuch as it will be necessary to divert the flow of only one stream around the plant, whereas two streams flow through the former site.

After a careful examination of the amended plans, I beg to recommend that they be approved and a permit issued allowing the discharge of effluent from the proposed sewage disposal plant into Cold Spring brook, a tributary of the Neversink river.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

NEW ROCHELLE

On March 17, 1910, application was made by the board of public works for the approval of plans for sewers in North avenue, Beechmont drive and Montgomery circle. These plans were approved on March 25, 1910, and a conditional permit was issued allowing the discharge, into Long Island sound, of sewage from the proposed sewers.

On March 22, 1910, an application was also made by the board of public works of New Rochelle asking for an extension of the time for filing plans for a clarification of the sewage discharged through the Bailey's Rock outlet, as was required by the permit issued on May 4, 1909, to be done within one year. The time for filing such plans was extended to February 1, 1911, as noted in a letter to the chief engineer of the board of public works dated March 25, 1910. A copy of this letter is printed below.

The permit issued on March 25, 1910, contains in addition to the usual revocation and modification clauses the following conditions:

1. That on or before February 1, 1911, satisfactory detailed plans shall be submitted to the Department providing for a clarification by means of efficient screening or sedimentation, or both, of the portion of the sewage of the city not treated in the sewage disposal plant at the foot of Morgan street; and that such plans shall also show in detail suitable works for supplementary, complete treatment of sewage.

2. That whenever required by the State Commissioner of Health the clarification works shown by the approved plans shall be constructed within the time then specified; and that whenever deemed necessary or desirable by the State Commissioner of Health suitable extensions to such clarification works shall be made or supplementary works shall be constructed for more complete treatment of sewage within the time specified by said Commissioner.

ALBANY, N. Y., *March* 22, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sewer extensions and for proposed alterations to the sewer system of the city of New Rochelle, Westchester county, submitted in person to this Department for approval on March 4, 1910, by Mr. J. K. Wilkes, chief engineer of the board of public works.

Several conferences have been held during the past year between the city officials and this Department in regard to extending the sewer system and providing sewerage facilities for a large territory that is being rapidly developed and built up north and northeast of Eastchester road.

The plans under consideration show that it is proposed to change the alignment, size and grade of the sewer in North avenue between Brookside place and Eastchester road; to extend the sewer in North avenue from Eastchester road to Broadview; also to change the alignment of sewers in Beechmont drive and Montgomery circle.

Plans were approved by this Department on March 22, 1904, providing for a 24-inch sewer running north from Brookside place in North avenue and through private land to Eastchester road. The portion of the sewer through private land was to follow, approximately, the course of a stream presumably to avoid deep rock cutting during construction. This sewer, however, has not been constructed.

It is stated in the report by the designing engineer that in order to "avoid certain physical difficulties of construction and also the usual delays and complications arising from acquiring the necessary rights of way," it is now proposed to abandon the route along the creek between Brookside place and Eastchester road and to construct a 27-inch sewer entirely in North avenue from Brookside place to Broadview, about 2,100 feet north of Eastchester road. This change will necessitate a cut of twenty feet in depth for a considerable distance in order that this sewer may at some future time intercept sewers to be constructed to serve streets in the low area to the west of the Inter-Urban Company's reservoir. The difference in the cost of the two routes is probably not great since it will be necessary to lay a small sewer in North avenue parallel to the intercepting sewer for a distance of some 900 feet, if the trunk sewer is constructed along the stream.

The plans also show that it is proposed, eventually, to extend this trunk sewer from Broadview in a northerly direction to Quaker Ridge road, a distance of some 6,400 feet, but since the present plans show only the probable location of such sewer, detailed plans for the extension of the proposed trunk sewer in North avenue should be submitted to this Department for approval before any extensions are made.

The territory that will ultimately be tributary to the new sewer is about 850 acres. Plans for sewers in a portion of this territory, known as Halcyon park, Beechmont and part of Sunsetview park, including about 200 acres of land, were approved on May 4, 1909. These sewers were tributary to the main intercepting sewer between Brookside place and Fifth avenue.

It is now proposed to change the alignment of sewers in parts of Beechmont drive and Montgomery circle in this section so as to discharge into the proposed trunk sewer at the intersection of Montgomery circle and North avenue, and not, as originally planned, into the existing trunk sewer between Brookside place and Fifth avenue. Both designs make these sewers tributary to the same outfall but at different points.

The plans have been carefully examined by the engineering division in regard to grades, sizes, velocities, capacities and other hydraulic and sanitary features concerning the proposed sewers and they are found to be properly designed to meet the future requirements of this district upon the usual basis of population and per capita consumption, and assuming that in the construction the sewers be made sufficiently watertight to prevent excess infiltration. A considerable saving could be made by reducing the size of the proposed 27" sewer between Beechmont drive and Brookside place, a distance of 1,055 feet. In any case of reducing the size of a main trunk sewer for a section having a steeper grade than the section above precaution should be taken to prevent any accidental stoppage which is more probable at such points of reduction in size than at other points in a sewer.

The plans for the sewage under consideration provide for sanitary sewage only, and it is understood that in the development of all branch and lateral sewers which will discharge into this interceptor in the future or in the extension of this sewer plans for such sewers shall be submitted for approval by this Department.

The existing outfall sewer, with outlet into Long Island sound at a point some 800 feet beyond Bailey's Rock to which the proposed sewer extensions are tributary, has been examined as to capacity to care for additional sewage. It is found that it is adequate for reasonable service in the future, but that it will probably be necessary to relieve that portion of the outfall sewer between Fifth avenue and the New York Central right of way before the additional territory made tributary to this sewer by the proposed sewer extensions is fully developed.

The general questions of extensions to the sewer system for the city of New Rochelle and the effect upon the waters of Long Island sound and the oyster beds in such waters of additional pollution from the discharge of sewage from the sewer system of the city were discussed at length in my report to you of April 14th on the examination of plans approved on May 4, 1909, and at that time it was advised that:

> "Owing to the comparative remoteness of any oyster beds from the existing outlet of the system of which the proposed sewers will be an extension, I am of the opinion that it will not be necessary to require at the present time a thorough purification of the sewage now discharged into this outlet from the existing sewers and the proposed extensions. I do believe, however, that with the rapid development that has taken place along this shore of Long Island sound, the importance of the oyster industry which must be protected, the desirability of curtailing visual pollution and possible offense in these waters and your consistent policy with the municipalities along this shore, it is necessary to require clarification of this sewage in the immediate future and to require that suitable provision be made to increase the efficiency of this purification at such a time or times in the future as local conditions may in your opinion demand."

The proposed extensions are tributary to the same outfall to which the extensions made the subject of the report quoted above were tributary. The permit granted for the discharge of sewage from sewers for which plans were approved on May 4, 1909, required that within one year satisfactory, detailed plans be submitted to the Department providing for a clarification of the sewage by efficient screening or sedimentation, or a combination of both, and that such plans shall show in detail also suitable works for the complete purification of the sewage.

From conferences which have been held with the members and officers of the board of public works of the city of New Rochelle during the past year concerning the preparation of these plans for treatment of sewage, it is seen that for various reasons, some of which are not under the control of the board of public works, it has not been possible for such board to prepare the plans as required for submission by May 4, 1910. Further, the Department is this day in receipt of an application from the chairman of the board of public works for an extension of the time within which plans for treatment of sewage were to be submitted to this Department for approval.

In view of the foregoing I would, therefore, recommend that the plans for a change in the alignment, size and grade of the sewer in North avenue between Brookside and Eastchester road; for the construction of a sewer in North avenue from Eastchester road to Broadview; and a change in the alignment of sewers in Beechmont drive and Montgomery circle be approved as submitted, and that the provisions requiring that plans for sewage treatment as embodied in the permit granted May 4, 1909, be included in the permit granted for discharge from the sewers proposed at this time, the terms of such requirement being substantially as were stated in the permit granted May 4, 1909, except that the time for filing said plans be extended to February 1, 1911.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *March* 25, 1910.

Mr. J. K. WILKES, *Chief Engineer Board of Public Works, New Rochelle, N. Y.:*

DEAR SIR:— I am sending you, under separate cover, by American Express, the approved plans for sewer extensions in North avenue, Beechmont drive and Montgomery circle, and am enclosing herewith a permit allowing the discharge into Long Island sound of sewage to be collected by the proposed sewers.

You will note that this permit to become operative must first be recorded in the county clerk's office of Westchester county.

In response to the application from the board of public works of New Rochelle, received on March 22d, asking for an extension of the time for filing plans for a clarification of the sewage discharged through the Bailey's Rock outlet, as was required by the permit issued on May 4, 1909, to be done within one year, I have extended the time for filing such plans to February 1, 1911.

I would at this time call your attention to the desirability of carefully considering in any proposed plans providing for treatment of sewage of the city of New Rochelle some provision for permanent treatment of the sewage now treated in the disposal plant at the foot of Morgan street. A study of this portion of the system and of the question of sewage disposal for this section may show that, on account of the comparatively obsolete type of this plant and the fact that the plant is overtaxed at the present time, it might be found advisable to arrange for treatment of sewage from this section in the same plant to be designed for treatment of the sewage now discharged through the Bailey's Rock outlet.

These matters, I presume, will be carefully considered by your Board in studies you are making of plans for sewage disposal for the city.

Very respectfully,

ALEC H. SEYMOUR,

Acting Commissioner of Health

NORTH TONAWANDA

Application was made by the board of public works, under date of March 16, 1910, for permission to discharge sewage into the Niagara river from proposed sewers in Cramer, Robinson and other streets, and plans covering these sewers were submitted for approval on April 8, 1910. These plans were approved on April 25, 1910, and a permit was issued allowing the discharge of sewage to be collected by the proposed sewers into Niagara river, on condition that whenever required by the State Commissioner of Health com-

plete plans satisfactory to this Department for the interception and treatment of the entire sanitary sewage of the city shall be submitted to this Department for approval; and that any or all portions of the works shown by such plans shall be constructed thereafter when required, and within the time limit set by the State Commissioner of Health.

ALBANY, N. Y., *April* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for proposed sanitary sewer extensions in the city of North Tonawanda, Niagara county, submitted to this Department for approval on April 8, 1910, by the city engineer.

The plans and documents submitted consist of:

1. One copy of report of city engineer.
2. One copy of specifications.
3. Application.

Tracing and blue print of:

4. Plan of pumphouse building.
5. Plan of pumping plant.
6. Two sheets of profiles of proposed sewers.
7. Plan of sewer district to be served by the proposed sewers.

The general plan of the city, recently submitted to the Department for filing, shows that although sewers have been constructed from time to time since 1889, no plans for sewers or sewer extensions have been submitted to or approved by this Department.

The plans now under consideration show that it is proposed to construct sewers in Cramer, Robinson, Rombolt and Zimmerman streets and Hagen avenue. These sewers are to carry sanitary sewage only and vary from 10" to 12" in diameter.

The plans of the proposed sewers have been carefully examined as to grades, sizes, velocities, capacities and other hydraulic and sanitary features, and all but the proposed extension in Hagen avenue are found to be satisfactory and adequate to meet the future requirements of the district to be served by them upon the usual assumed basis of population and water consumption, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excessive infiltration of ground water.

The plans show that the proposed 10" sewer in Hagen avenue is to be constructed on a .25 per cent. grade except for the last fifty feet near the manhole at Rombolt street where the grade suddenly changes to about 8 per cent. The slope of this sewer should be made at least .3 per cent, for the entire length in order to better insure self-cleansing velocities which will probably not be obtained under the proposed conditions even though a flush tank is placed at the upper end of a sewer, since the sewer is some 2,200 feet long. The vertical alignment should also be made straight between manholes so as to facilitate cleaning and inspection. This can be done by installing a drop manhole at the intersection of Rombolt street and Hagen avenue or by installing an additional manhole at the change of grade.

It also appears from the examination of the plans that the invert elevation of the sewer at the upper end of Cramer street should be 568.46 instead of 563.46, this evidently being an error made in marking elevations on the map and profile.

The sewage to be collected by the proposed sewers is to be conveyed by gravity to a pumping station to be located near the intersection of Rombolt and Division streets. Two automatic and electrically operated 4" centrifugal pumps are to be installed at the pumping station which will raise the sewage some fifteen feet and discharge it into the existing sewer system.

According to the city engineer's report each pump is to have a capacity of 470 gallons per minute which should be adequate to care for the sanitary sewage contributed by the proposed sewers.

Respecting the advisability of allowing the temporary discharge of an increased amount of sanitary sewage from North Tonawanda into the Niagara river it may be stated that at present no municipality derives its water supply from the river below North Tonawanda, or from Lake Ontario near the mouth of the river, except Niagara Falls. The city of Niagara Falls is planning to improve its water supply, and while my report on an investigation of proposed water supply for Niagara Falls, dated December 26, 1907, was transmitted by you to the city authorities, it is not known if the city intends to follow the recommendations contained in said report.

The seriously contaminated condition of a supply taken from the American channel was pointed out in the report above referred to, and in this report it was shown that a relatively pure water could be secured from the Canadian channel which would avoid the pollution from North Tonawanda.

Even if the present sewage of North Tonawanda were excluded from the river the discharge of sewage from Buffalo and Tonawanda would make it just as imperative for Niagara Falls to extend its intake to the Canadian channel in order to obtain a supply relatively free from contamination.

It would seem, therefore, that since the purification of the sewage of North Tonawanda would not materially lessen the desirability of an extension of the Niagara Falls intake to the Canadian channel the adoption of any requirement for the purification of such sewage may reasonably be deferred until some comprehensive plan has been adopted looking toward the removal of other and greater amounts of sewage from the river.

Since the volume of the flow in the river is great and the currents of the river are swift there will be abundant opportunity for aeration and dispersion, and as a result there will be no danger that the additional discharge of sewage proposed will have any effect in causing a nuisance in or along the river below the city.

In view of the foregoing, I beg to recommend that the plans be approved and a permit be issued allowing the discharge into Niagara river of sewage to be collected by the proposed sewers, such permit to contain the usual revocation and modification clauses, together with a stipulation that the gradient of the Hagen avenue sewer be increased to 0.3 per cent., and that the vertical alignment of the sewer be made straight betweeen manholes.

I would further recommend that the permit require the submission of complete plans for interception and treatment of the sanitary sewage of the city and the construction of any or all portions of the works shown by the plans when required by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

OGDENSBURG

On May 26, 1910, application was made by the board of public works for the approval of plans for proposed sewer extensions in Market, Brown and Jackson streets. These plans were approved on June 15, 1910, and a permit was issued allowing the discharge into the Oswegatchie river of sewage to be collected by the proposed sewers.

On August 12, 1910, application was also made for the approval of plans for sewer extensions in Rensselaer avenue and Oak street. These plans were approved on August 26, 1910, and a permit was issued allowing the discharge into the Oswegatchie river of sewage from the proposed sewers.

ALBANY, N. Y., *June* 8, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on the examination of plans for proposed sanitary sewer extensions in the city of Ogdensburg, St. Lawrence county, submitted to this Department for approval by the board of public works on May 26, 1910.

The plans show that it is proposed to construct some 480 feet of 10" and 12" sewers in Market street from the intersection of Jackson and Market streets to the upper end of the existing stone sewer which commences at Commerce street and discharges into the raceway tributary to the Oswegatchie river through outlet No. 12. It is also proposed to construct two short sections of 8" sewers in Jackson and Brown streets between Main and Market streets and tributary to the proposed Market street sewer.

Owing to the necessarily flat grade of the proposed sewer in Market street it is proposed to tap the existing sewer in Main street at Jackson street so as to obtain a greater depth of flow of sewage in this sewer at all times. In addition to increasing the flow by diverting some of the sewage from the Main street sewer a more uniform flow through the entire length of the proposed sewer in Market street would result if the invert elevation of the manhole at Brown street be lowered somewhat so as to obtain a slightly greater slope of the 10" sewer and at the same time decrease the grade of the 12" section of this sewer. More satisfactory results could probably be obtained by making the proposed sewer 12" in diameter for the entire distance. The sewer will probably require cleaning occasionally no matter which one of the two alternative changes is adopted. The sewer is, however, adequate as to size and capacity if properly constructed to meet the future requirement of the section to be served by it.

I would, therefore, recommend that the plans be approved and a permit issued allowing the discharge of sewage from the proposed sewer into the raceway tributary to the Oswegatchie river through outlet No. 12.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *August* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on the examination of plans for sanitary sewer extensions in the city of Ogdensbúrg, St. Lawrence county, submitted to this Department for approval by the city clerk on behalf of the board of public works, on August 12, 1910.

These plans, as first submitted for approval, did not contain sufficient data to enable the engineering division to pass upon the plans and they were, therefore, returned to the city engineer for additional information. Amended plans were resubmitted for approval on August 23, 1910.

The plans now under consideration show that it is proposed to construct sewer extensions in Rensselaer avenue and Oak street. The proposed sewer in Rensselaer avenue is to be laid on a slope of 3.5 per cent. for a distance of 400 feet between Adams and Jefferson avenue and is to have a slope of 1.23 per cent. for a distance of 200 feet westerly from Jefferson avenue. A manhole is to be installed at the intersection of Jefferson avenue and Rensselaer avenue and a lamphole is to be located at the upper end of this sewer. Owing to the short length of this section of the proposed extension it appears that a lamphole should afford adequate facilities for cleaning and inspection.

The proposed sewer in Oak street is to be constructed on a slope of 0.4 per cent. for a distance of 180 feet easterly from Ford avenue, and is to be provided with a lamphole at the upper end of the sewer which should be adequate for purposes of cleaning and inspection, inasmuch as the section of sewer is comparatively short.

These sewers will probably never be extended inasmuch as the proposed sewer in Rensselaer avenue is to extend to the limit of the watershed in that avenue, and in the case of Oak street extension there is at present a sewer in New York avenue which is the next street east of Ford avenue and will prevent any extension of the proposed sewer in Oak street.

The plans for the proposed sewer extensions have been carefully examined and it is found that the sewers are adequate for future requirements of the districts to be served by them, if properly constructed.

I, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of sewage to be collected by the proposed sanitary sewer extension into the Oswegatchie river through the existing outlet No. 4 which empties into the raceway crossing, Main street.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ONEONTA

On June 18, 1910, plans for sewer extensions in London avenue, Henry and other streets were submitted for approval by the board of public works of the city of Oneonta. These plans were approved on July 20, 1910, and a conditional permit was issued allowing the discharge into the Susquehanna river of sewage to be collected by the proposed sewers.

On August 11, 1910, plans for a proposed sewer extension in West street were submitted for approval. These plans were approved on August 17, 1910, and a permit was issued allowing the discharge of sewage from the proposed sewer into the Susquehanna river, on condition that on or before April 1, 1911, plans satisfactory to this Department for complete sewage disposal works to treat the entire sanitary sewage of the city of Oneonta, accompanied by a proper application for the approval thereof, shall be submitted to this Department for approval, together with plans for such intercepting and outfall sewers as may be necessary to convey the sanitary sewage of the city to the site or sites selected for such sewage disposal works, and that, whenever in the opinion of the State Commissioner of Health it is deemed necessary or desirable, any designated portion, or all of, said sewage disposal works shall be constructed within the time limit there specified.

ALBANY, N. Y., *July* 20, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for sanitary sewer extensions in the city of Oneonta, Otsego county, submitted to this Department for approval by the board of public works on June 18, 1910.

The plans show that it is proposed to construct 8″ sewer extensions in London avenue between River and Henry streets, in Henry street between London and Burnside avenues, and in Burnside avenue between Henry and Luther streets, all of which will discharge into the Susquehanna river through the present outlet at the foot of Main street; also 8″ sewers in Norton avenue between Third and Fourth streets, and in Fourth street between Norton avenue and Main street with outlet into the Susquehanna river at the foot of Hunt street; also an 8″ sewer extension in Spruce street east of East street for some 240 feet, with an outlet into the river through the existing outlet at the foot of Hunt street.

These plans have been carefully examined in regard to grades, velocities, capacities and other hydraulic and sanitary features in connection with the proposed sewer extensions, and with some exceptions noted later it is found that they are adequate to satisfactorily meet the future requirements for sanitary sewage of the sections to be served by them on the usual assumptions as to population and water consumption, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excess infiltration of ground water.

However, the gradient or slope of the proposed sewer extension in Norton avenue is too flat and should be increased to at least 0.4 per cent., so as to

The amended plans and documents recently submitted comprise the following:

1. Duplicate reports and specifications.

Tracings and prints of:

2. Topographical map showing alignment of a portion of the sewer system and the new location of the sewage disposal plant.
3. Amended plan of sewage disposal works.
4. Plan of former sewage disposal plant to be superseded.
5. Profile of main outfall sewer.

The plans now under consideration show that it is proposed to change the location of the sewage disposal plant to a site some 1,200 feet to the southwest and up-stream on Cold Spring brook from the site shown upon the plans approved last December. It is stated in the application for the approval of the amended plans that the change in location of the plant is necessitated by the inability to secure a site at the point shown by the approved plans.

While the general arrangement of the different parts of the disposal plant has been changed to suit the new conditions of topography of the changed location, the capacity of the plant is the same as that shown by the former plans.

The approved plans proposed to divide the irrigation field into three units, one having a superficial area of two acres and two units of about one acre each. The present plans show that it is proposed to divide the field into four units of about one acre each. The amended plans also provide for a somewhat different method of applying the sewage to the contact beds as well as a field for the disposal of sludge adjacent to the proposed irrigation field.

The new location of the proposed disposal plant seems to be more suitable for a disposal site than the former, inasmuch as it will be necessary to divert the flow of only one stream around the plant, whereas two streams flow through the former site.

After a careful examination of the amended plans, I beg to recommend that they be approved and a permit issued allowing the discharge of effluent from the proposed sewage disposal plant into Cold Spring brook, a tributary of the Neversink river.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

NEW ROCHELLE

On March 17, 1910, application was made by the board of public works for the approval of plans for sewers in North avenue, Beechmont drive and Montgomery circle. These plans were approved on March 25, 1910, and a conditional permit was issued allowing the discharge, into Long Island sound, of sewage from the proposed sewers.

On March 22, 1910, an application was also made by the board of public works of New Rochelle asking for an extension of the time for filing plans for a clarification of the sewage discharged through the Bailey's Rock outlet, as was required by the permit issued on May 4, 1909, to be done within one year. The time for filing such plans was extended to February 1, 1911, as noted in a letter to the chief engineer of the board of public works dated March 25, 1910. A copy of this letter is printed below.

The permit issued on March 25, 1910, contains in addition to the usual revocation and modification clauses the following conditions:

1. That on or before February 1, 1911, satisfactory detailed plans shall be submitted to the Department providing for a clarification by means of efficient screening or sedimentation, or both, of the portion of the sewage of the city not treated in the sewage disposal plant at the foot of Morgan street; and that such plans shall also show in detail suitable works for supplementary, complete treatment of sewage.

2. That whenever required by the State Commissioner of Health the clarification works shown by the approved plans shall be constructed within the time then specified; and that whenever deemed necessary or desirable by the State Commissioner of Health suitable extensions to such clarification works shall be made or supplementary works shall be constructed for more complete treatment of sewage within the time specified by said Commissioner.

ALBANY, N. Y., *March* 22, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sewer extensions and for proposed alterations to the sewer system of the city of New Rochelle, Westchester county, submitted in person to this Department for approval on March 4, 1910, by Mr. J. K. Wilkes, chief engineer of the board of public works.

Several conferences have been held during the past year between the city officials and this Department in regard to extending the sewer system and providing sewerage facilities for a large territory that is being rapidly developed and built up north and northeast of Eastchester road.

The plans under consideration show that it is proposed to change the alignment, size and grade of the sewer in North avenue between Brookside place and Eastchester road; to extend the sewer in North avenue from Eastchester road to Broadview; also to change the alignment of sewers in Beechmont drive and Montgomery circle.

Plans were approved by this Department on March 22, 1904, providing for a 24-inch sewer running north from Brookside place in North avenue and through private land to Eastchester road. The portion of the sewer through private land was to follow, approximately, the course of a stream presumably to avoid deep rock cutting during construction. This sewer, however, has not been constructed.

It is stated in the report by the designing engineer that in order to "avoid certain physical difficulties of construction and also the usual delays and complications arising from acquiring the necessary rights of way," it is now proposed to abandon the route along the creek between Brookside place and Eastchester road and to construct a 27-inch sewer entirely in North avenue from Brookside place to Broadview, about 2,100 feet north of Eastchester road. This change will necessitate a cut of twenty feet in depth for a considerable distance in order that this sewer may at some future time intercept sewers to be constructed to serve streets in the low area to the west of the Inter-Urban Company's reservoir. The difference in the cost of the two routes is probably not great since it will be necessary to lay a small sewer in North avenue parallel to the intercepting sewer for a distance of some 900 feet, if the trunk sewer is constructed along the stream.

The plans also show that it is proposed, eventually, to extend this trunk sewer from Broadview in a northerly direction to Quaker Ridge road, a distance of some 6,400 feet, but since the present plans show only the probable location of such sewer, detailed plans for the extension of the proposed trunk sewer in North avenue should be submitted to this Department for approval before any extensions are made.

The territory that will ultimately be tributary to the new sewer is about 850 acres. Plans for sewers in a portion of this territory, known as Halcyon park, Beechmont and part of Sunsetview park, including about 200 acres of land, were approved on May 4, 1909. These sewers were tributary to the main intercepting sewer between Brookside place and Fifth avenue.

It is now proposed to change the alignment of sewers in parts of Beechmont drive and Montgomery circle in this section so as to discharge into the proposed trunk sewer at the intersection of Montgomery circle and North avenue, and not, as originally planned, into the existing trunk sewer between Brookside place and Fifth avenue. Both designs make these sewers tributary to the same outfall but at different points.

The plans have been carefully examined by the engineering division in regard to grades, sizes, velocities, capacities and other hydraulic and sanitary features concerning the proposed sewers and they are found to be properly designed to meet the future requirements of this district upon the usual basis of population and per capita consumption, and assuming that in the construction the sewers be made sufficiently watertight to prevent excess infiltration. A considerable saving could be made by reducing the size of the proposed 27" sewer between Beechmont drive and Brookside place, a distance of 1,055 feet. In any case of reducing the size of a main trunk sewer for a section having a steeper grade than the section above precaution should be taken to prevent any accidental stoppage which is more probable at such points of reduction in size than at other points in a sewer.

The plans for the sewage under consideration provide for sanitary sewage only, and it is understood that in the development of all branch and lateral sewers which will discharge into this interceptor in the future or in the extension of this sewer plans for such sewers shall be submitted for approval by this Department.

The existing outfall sewer, with outlet into Long Island sound at a point some 800 feet beyond Bailey's Rock to which the proposed sewer extensions are tributary, has been examined as to capacity to care for additional sewage. It is found that it is adequate for reasonable service in the future, but that it will probably be necessary to relieve that portion of the outfall sewer between Fifth avenue and the New York Central right of way before the additional territory made tributary to this sewer by the proposed sewer extensions is fully developed.

The general questions of extensions to the sewer system for the city of New Rochelle and the effect upon the waters of Long Island sound and the oyster beds in such waters of additional pollution from the discharge of sewage from the sewer system of the city were discussed at length in my report to you of April 14th on the examination of plans approved on May 4, 1909, and at that time it was advised that:

> "Owing to the comparative remoteness of any oyster beds from the existing outlet of the system of which the proposed sewers will be an extension, I am of the opinion that it will not be necessary to require at the present time a thorough purification of the sewage now discharged into this outlet from the existing sewers and the proposed extensions. I do believe, however, that with the rapid development that has taken place along this shore of Long Island sound, the importance of the oyster industry which must be protected, the desirability of curtailing visual pollution and possible offense in these waters and your consistent policy with the municipalities along this shore, it is necessary to require clarification of this sewage in the immediate future and to require that suitable provision be made to increase the efficiency of this purification at such a time or times in the future as local conditions may in your opinion demand."

The proposed extensions are tributary to the same outfall to which the extensions made the subject of the report quoted above were tributary. The permit granted for the discharge of sewage from sewers for which plans were approved on May 4, 1909, required that within one year satisfactory, detailed plans be submitted to the Department providing for a clarification of the sewage by efficient screening or sedimentation, or a combination of both, and that such plans shall show in detail also suitable works for the complete purification of the sewage.

From conferences which have been held with the members and officers of the board of public works of the city of New Rochelle during the past year concerning the preparation of these plans for treatment of sewage, it is seen that for various reasons, some of which are not under the control of the board of public works, it has not been possible for such board to prepare the plans as required for submission by May 4, 1910. Further, the Department is this day in receipt of an application from the chairman of the board of public works for an extension of the time within which plans for treatment of sewage were to be submitted to this Department for approval.

In view of the foregoing I would, therefore, recommend that the plans for a change in the alignment, size and grade of the sewer in North avenue between Brookside and Eastchester road; for the construction of a sewer in North avenue from Eastchester road to Broadview; and a change in the alignment of sewers in Beechmont drive and Montgomery circle be approved as submitted, and that the provisions requiring that plans for sewage treatment as embodied in the permit granted May 4, 1909, be included in the permit granted for discharge from the sewers proposed at this time, the terms of such requirement being substantially as were stated in the permit granted May 4, 1909, except that the time for filing said plans be extended to February 1, 1911.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 25, 1910.

Mr. J. K. WILKES, *Chief Engineer Board of Public Works, New Rochelle, N. Y.:*

DEAR SIR:—I am sending you, under separate cover, by American Express, the approved plans for sewer extensions in North avenue, Beechmont drive and Montgomery circle, and am enclosing herewith a permit allowing the discharge into Long Island sound of sewage to be collected by the proposed sewers.

You will note that this permit to become operative must first be recorded in the county clerk's office of Westchester county.

In response to the application from the board of public works of New Rochelle, received on March 22d, asking for an extension of the time for filing plans for a clarification of the sewage discharged through the Bailey's Rock outlet, as was required by the permit issued on May 4, 1909, to be done within one year, I have extended the time for filing such plans to February 1, 1911.

I would at this time call your attention to the desirability of carefully considering in any proposed plans providing for treatment of sewage of the city of New Rochelle some provision for permanent treatment of the sewage now treated in the disposal plant at the foot of Morgan street. A study of this portion of the system and of the question of sewage disposal for this section may show that, on account of the comparatively obsolete type of this plant and the fact that the plant is overtaxed at the present time, it might be found advisable to arrange for treatment of sewage from this section in the same plant to be designed for treatment of the sewage now discharged through the Bailey's Rock outlet.

These matters, I presume, will be carefully considered by your Board in studies you are making of plans for sewage disposal for the city.

Very respectfully,
ALEC H. SEYMOUR,
Acting Commissioner of Health

NORTH TONAWANDA

Application was made by the board of public works, under date of March 16, 1910, for permission to discharge sewage into the Niagara river from proposed sewers in Cramer, Robinson and other streets, and plans covering these sewers were submitted for approval on April 8, 1910. These plans were approved on April 25, 1910, and a permit was issued allowing the discharge of sewage to be collected by the proposed sewers into Niagara river, on condition that whenever required by the State Commissioner of Health com-

plete plans satisfactory to this Department for the interception and treatment of the entire sanitary sewage of the city shall be submitted to this Department for approval; and that any or all portions of the works shown by such plans shall be constructed thereafter when required, and within the time limit set by the State Commissioner of Health.

ALBANY, N. Y., *April* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for proposed sanitary sewer extensions in the city of North Tonawanda, Niagara county, submitted to this Department for approval on April 8, 1910, by the city engineer.

The plans and documents submitted consist of:

1. One copy of report of city engineer.
2. One copy of specifications.
3. Application.

Tracing and blue print of:

4. Plan of pumphouse building.
5. Plan of pumping plant.
6. Two sheets of profiles of proposed sewers.
7. Plan of sewer district to be served by the proposed sewers.

The general plan of the city, recently submitted to the Department for filing, shows that although sewers have been constructed from time to time since 1889, no plans for sewers or sewer extensions have been submitted to or approved by this Department.

The plans now under consideration show that it is proposed to construct sewers in Cramer, Robinson, Rombolt and Zimmerman streets and Hagen avenue. These sewers are to carry sanitary sewage only and vary from 10" to 12" in diameter.

The plans of the proposed sewers have been carefully examined as to grades, sizes, velocities, capacities and other hydraulic and sanitary features, and all but the proposed extension in Hagen avenue are found to be satisfactory and adequate to meet the future requirements of the district to be served by them upon the usual assumed basis of population and water consumption, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excessive infiltration of ground water.

The plans show that the proposed 10" sewer in Hagen avenue is to be constructed on a .25 per cent. grade except for the last fifty feet near the manhole at Rombolt street where the grade suddenly changes to about 8 per cent. The slope of this sewer should be made at least .3 per cent. for the entire length in order to better insure self-cleansing velocities which will probably not be obtained under the proposed conditions even though a flush tank is placed at the upper end of a sewer, since the sewer is some 2,200 feet long. The vertical alignment should also be made straight between manholes so as to facilitate cleaning and inspection. This can be done by installing a drop manhole at the intersection of Rombolt street and Hagen avenue or by installing an additional manhole at the change of grade.

It also appears from the examination of the plans that the invert elevation of the sewer at the upper end of Cramer street should be 568.46 instead of 563.46, this evidently being an error made in marking elevations on the map and profile.

The sewage to be collected by the proposed sewers is to be conveyed by gravity to a pumping station to be located near the intersection of Rombolt and Division streets. Two automatic and electrically operated 4" centrifugal pumps are to be installed at the pumping station which will raise the sewage some fifteen feet and discharge it into the existing sewer system.

According to the city engineer's report each pump is to have a capacity of 470 gallons per minute which should be adequate to care for the sanitary sewage contributed by the proposed sewers.

Respecting the advisability of allowing the temporary discharge of an increased amount of sanitary sewage from North Tonawanda into the Niagara river it may be stated that at present no municipality derives its water supply from the river below North Tonawanda, or from Lake Ontario near the mouth of the river, except Niagara Falls. The city of Niagara Falls is planning to improve its water supply, and while my report on an investigation of proposed water supply for Niagara Falls, dated December 26, 1907, was transmitted by you to the city authorities, it is not known if the city intends to follow the recommendations contained in said report.

The seriously contaminated condition of a supply taken from the American channel was pointed out in the report above referred to, and in this report it was shown that a relatively pure water could be secured from the Canadian channel which would avoid the pollution from North Tonawanda.

Even if the present sewage of North Tonawanda were excluded from the river the discharge of sewage from Buffalo and Tonawanda would make it just as imperative for Niagara Falls to extend its intake to the Canadian channel in order to obtain a supply relatively free from contamination.

It would seem, therefore, that since the purification of the sewage of North Tonawanda would not materially lessen the desirability of an extension of the Niagara Falls intake to the Canadian channel the adoption of any requirement for the purification of such sewage may reasonably be deferred until some comprehensive plan has been adopted looking toward the removal of other and greater amounts of sewage from the river.

Since the volume of the flow in the river is great and the currents of the river are swift there will be abundant opportunity for aeration and dispersion, and as a result there will be no danger that the additional discharge of sewage proposed will have any effect in causing a nuisance in or along the river below the city.

In view of the foregoing, I beg to recommend that the plans be approved and a permit be issued allowing the discharge into Niagara river of sewage to be collected by the proposed sewers, such permit to contain the usual revocation and modification clauses, together with a stipulation that the gradient of the Hagen avenue sewer be increased to 0.3 per cent., and that the vertical alignment of the sewer be made straight betweeen manholes.

I would further recommend that the permit require the submission of complete plans for interception and treatment of the sanitary sewage of the city and the construction of any or all portions of the works shown by the plans when required by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

OGDENSBURG

On May 26, 1910, application was made by the board of public works for the approval of plans for proposed sewer extensions in Market, Brown and Jackson streets. These plans were approved on June 15, 1910, and a permit was issued allowing the discharge into the Oswegatchie river of sewage to be collected by the proposed sewers.

On August 12, 1910, application was also made for the approval of plans for sewer extensions in Rensselaer avenue and Oak street. These plans were approved on August 26, 1910, and a permit was issued allowing the discharge into the Oswegatchie river of sewage from the proposed sewers.

ALBANY, N. Y., *June* 8, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for proposed sanitary sewer extensions in the city of Ogdensburg, St. Lawrence county, submitted to this Department for approval by the board of public works on May 26, 1910.

The plans show that it is proposed to construct some 480 feet of 10" and 12" sewers in Market street from the intersection of Jackson and Market streets to the upper end of the existing stone sewer which commences at Commerce street and discharges into the raceway tributary to the Oswegatchie river through outlet No. 12. It is also proposed to construct two short sections of 8" sewers in Jackson and Brown streets between Main and Market streets and tributary to the proposed Market street sewer.

Owing to the necessarily flat grade of the proposed sewer in Market street it is proposed to tap the existing sewer in Main street at Jackson street so as to obtain a greater depth of flow of sewage in this sewer at all times. In addition to increasing the flow by diverting some of the sewage from the Main street sewer a more uniform flow through the entire length of the proposed sewer in Market street would result if the invert elevation of the manhole at Brown street be lowered somewhat so as to obtain a slightly greater slope of the 10" sewer and at the same time decrease the grade of the 12" section of this sewer. More satisfactory results could probably be obtained by making the proposed sewer 12" in diameter for the entire distance. The sewer will probably require cleaning occasionally no matter which one of the two alternative changes is adopted. The sewer is, however, adequate as to size and capacity if properly constructed to meet the future requirement of the section to be served by it.

I would, therefore, recommend that the plans be approved and a permit issued allowing the discharge of sewage from the proposed sewer into the raceway tributary to the Oswegatchie river through outlet No. 12.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *August* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for sanitary sewer extensions in the city of Ogdensbúrg, St. Lawrence county, submitted to this Department for approval by the city clerk on behalf of the board of public works, on August 12, 1910.

These plans, as first submitted for approval, did not contain sufficient data to enable the engineering division to pass upon the plans and they were, therefore, returned to the city engineer for additional information. Amended plans were resubmitted for approval on August 23, 1910.

The plans now under consideration show that it is proposed to construct sewer extensions in Rensselaer avenue and Oak street. The proposed sewer in Rensselaer avenue is to be laid on a slope of 3.5 per cent. for a distance of 400 feet between Adams and Jefferson avenue and is to have a slope of 1.23 per cent. for a distance of 200 feet westerly from Jefferson avenue. A manhole is to be installed at the intersection of Jefferson avenue and Rensselaer avenue and a lamphole is to be located at the upper end of this sewer. Owing to the short length of this section of the proposed extension it appears that a lamphole should afford adequate facilities for cleaning and inspection.

The proposed sewer in Oak street is to be constructed on a slope of 0.4 per cent. for a distance of 180 feet easterly from Ford avenue, and is to be provided with a lamphole at the upper end of the sewer which should be adequate for purposes of cleaning and inspection, inasmuch as the section of sewer is comparatively short.

These sewers will probably never be extended inasmuch as the proposed sewer in Rensselaer avenue is to extend to the limit of the watershed in that avenue, and in the case of Oak street extension there is at present a sewer in New York avenue which is the next street east of Ford avenue and will prevent any extension of the proposed sewer in Oak street.

The plans for the proposed sewer extensions have been carefully examined and it is found that the sewers are adequate for future requirements of the districts to be served by them, if properly constructed.

I, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of sewage to be collected by the proposed sanitary sewer extension into the Oswegatchie river through the existing outlet No. 4 which empties into the raceway crossing, Main street.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ONEONTA

On June 18, 1910, plans for sewer extensions in London avenue, Henry and other streets were submitted for approval by the board of public works of the city of Oneonta. These plans were approved on July 20, 1910, and a conditional permit was issued allowing the discharge into the Susquehanna river of sewage to be collected by the proposed sewers.

On August 11, 1910, plans for a proposed sewer extension in West street were submitted for approval. These plans were approved on August 17, 1910, and a permit was issued allowing the discharge of sewage from the proposed sewer into the Susquehanna river, on condition that on or before April 1, 1911, plans satisfactory to this Department for complete sewage disposal works to treat the entire sanitary sewage of the city of Oneonta, accompanied by a proper application for the approval thereof, shall be submitted to this Department for approval, together with plans for such intercepting and outfall sewers as may be necessary to convey the sanitary sewage of the city to the site or sites selected for such sewage disposal works, and that, whenever in the opinion of the State Commissioner of Health it is deemed necessary or desirable, any designated portion, or all of, said sewage disposal works shall be constructed within the time limit there specified.

Albany, N. Y., *July* 20, 1910.

Eugene H. Porter, M.D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir: — I beg to submit the following report on the examination of plans for sanitary sewer extensions in the city of Oneonta, Otsego county, submitted to this Department for approval by the board of public works on June 18, 1910.

The plans show that it is proposed to construct 8" sewer extensions in London avenue between River and Henry streets, in Henry street between London and Burnside avenues, and in Burnside avenue between Henry and Luther streets, all of which will discharge into the Susquehanna river through the present outlet at the foot of Main street; also 8" sewers in Norton avenue between Third and Fourth streets, and in Fourth street between Norton avenue and Main street with outlet into the Susquehanna river at the foot of Hunt street; also an 8" sewer extension in Spruce street east of East street for some 240 feet, with an outlet into the river through the existing outlet at the foot of Hunt street.

These plans have been carefully examined in regard to grades, velocities, capacities and other hydraulic and sanitary features in connection with the proposed sewer extensions, and with some exceptions noted later it is found that they are adequate to satisfactorily meet the future requirements for sanitary sewage of the sections to be served by them on the usual assumptions as to population and water consumption, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excess infiltration of ground water.

However, the gradient or slope of the proposed sewer extension in Norton avenue is too flat and should be increased to at least 0.4 per cent., so as to

insure securing self-cleansing velocities, inasmuch as no facilities for systematic flushing are provided, and this sewer will probably seldom, if ever, flow more than half full.

The plans also show two changes of grade or vertical alignment in the prpoposed sewer in Fourth street, with no manholes at these points. As was pointed out in my former report on the examination of plans for sewer extensions in the city of Oneonta, dated September 14, 1909, manholes should be installed at all points of change of grade or alignment in order to facilitate cleaning and inspection.

Reference is also made to my report of September 14, 1909, for a review of the present status of sewerage in the city, as well as for a discussion as to the condition of pollution of the Susquehanna river, in which report these matters were carefully considered.

I beg to recommend that the plans be approved and a permit issued allowing the discharge into the Susquehanna river of sewage to be collected by the proposed sewers, on condition that the gradient of the proposed sewer in Norton avenue be increased to at least 0.4 per cent., and that manholes be inserted at all changes of grade or alignment in connection with the proposed sewer in Fourth street. I would also recommend that the permit contain the provisions, as to the future disposal of the sewage of the city of Oneonta, embodied in the permit issued to the board of public works on September 22, 1909.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *August* 17, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for sanitary sewer extension in West street in the city of Oneonta. Otsego county, submitted to this Department for approval by the board of public works, on August 11, 1910.

The plans show that it is proposed to construct 600 feet of 8" sewers on a grade of 5.2 per cent., between Cherry and Center streets. According to the statements made by the city engineer this sewer extension is for the purpose of improving the sanitary conditions of one house now located on this section of West street by providing sewerage facilities for it.

Inasmuch as this sewer will probably not be extended it should be adequate as to size and capacity to meet the probable demand that may be made upon it in the future.

I beg to recommend that plans be approved and a permit issued allowing the discharge into the Susquehanna river of sewage to be collected by the proposed sewer extension, and would also recommend that this permit contain provisions, as to the future disposal of the sewage of the city of Oneonta, embodied in the permits issued to the board of public works on September 22, 1909, and July 20, 1910.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

OSWEGO

On November 29, 1910, plans for combined sewer extensions to the East Eleventh street trunk sewer in the city of Oswego were submitted for approval by the commissioner of works. These plans were approved on December 20, 1910, and a permit was issued allowing the discharge into Lake Ontario of sewage to be collected by the proposed sewers. This permit contains,

in addition to the usual revocation and modification clauses, the following conditions:

(1) That on or before March 1, 1911, detailed plans for settling sedimentation or septic tanks to treat the dry weather flow of sewage tributary to the East Eleventh street trunk sewer in the city of Oswego, which shall meet the requirements of this Department, accompanied by general plans for additional or supplementary works for more complete treatment of such sewage, shall be submitted to this Department for approval.

(2) That the said settling, sedimentation or septic tanks shall be constructed and put in operation by September 1, 1911.

(3) That whenever required by the State Commissioner of Health detailed plans for said additional works for more complete treatment of the dry weather flow of sewage, conveyed by the East Eleventh street trunk sewer, shall be submitted for approval; and that any or all portions of said additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation when required by the State Commissioner of Health.

On December 6, 1910, plans for a sanitary sewer extension in West Seneca street were submitted for approval. These plans were examined and returned to the city engineer for revision and additional data. Revised plans were submitted for approval on December 16, 1910, and were approved on December 23, 1910, and a conditional permit was issued allowing the discharge into Lake Ontario of sewage from the proposed sewer.

ALBANY, N. Y., *December* 5, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans for sewer extensions to the combined sewer system in the East Side sewer district of Oswego, Oswego county, submitted to this Department for approval by the city engineer, on November 29, 1910:

The records of the Department show that plans for a trunk sewer in East Eleventh and other streets in this district showing also a proposed location of a sewage disposal plant were approved on May 21, 1909. This sewer is on the combined plan and discharges into the lake at the foot of East Eleventh street.

The permit issued in connection with the approval of these plans contains, in addition to the usual revocation and modification clauses, the following conditions:

That whenever required by the State Commissioner of Health:

1. Detailed plans satisfactory to this Department shall be submitted for approval, showing settling or septic tanks to treat the dry weather flow of sewage to be collected by the proposed sewers.
2. Plans for further treatment of such sewage, in addition to settling tank or septic tank treatment shall be submitted for approval.
3. Within the period specified at such time such sewage disposal works as may be required shall be constructed and put in operation.

The plans now before the Department and under consideration provide for a comprehensive system of lateral sewer extensions tributary to the East Eleventh street trunk sewer and are designed to carry both storm water and sanitary sewage. These sewers vary in diameter from 10" to 30" and inasmuch as most of the extensions are comparatively short and the gradients rather steep it appears that they should be adequate as to capacities to meet the requirement of the district to be served by them for a reasonable period in the future, provided that the sewers be properly constructed. While the proposed sewers appear to be adequate both as to sizes and capacities to meet the requirements for sanitary sewerage, no attempt has been made, however, to determine closely the adequacy of these lateral sewers to satisfactorily care for the storm water when the district to be served by them is fully developed.

The question of the future disposal of the sewage to be collected by the

proposed sewer and the effect on the proposed water supply of the city of the discharge into Lake Ontario of untreated sewage was discussed in my report of May 12, 1909, on the examination of the plans for the trunk sewer.

In view of the fact that the plans under consideration provide for an extension of the sewer system in this section of the city to cover, practically, the entire developed area east of the Oswego river, I believe that the city authorities should be required to provide at an early date for at least settling or septic tank treatment of the dry weather flow of sewage from this district.

I, therefore, recommend that the plans be approved and that the permit, to be issued in connection with the approval of the plans, contain in addition to the usual revocation and modification clauses, the condition that detailed plans for settling or for septic tanks to treat the dry weather flow of sewage tributary to the East Eleventh street trunk sewer accompanied by general plans for more complete treatment of sewage shall be submitted to this Department for approval on or before March 1, 1911, and that such settling or septic tanks shall be constructed and put in operation by September 1, 1911.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *December* 13, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a sanitary sewer extension in the city of Oswego, Oswego county, submitted to this Department for approval by the city engineer on behalf of the commissioner of works on December 6, 1910.

The plans submitted show a general plan of the proposed sanitary sewer system covering a portion of the northwesterly section of Oswego and show also plans and profiles of proposed sanitary and storm water sewers in West Seneca and other streets. Owing to the proposed improvement by the State Highway Commissioner of West Seneca street immediate consideration and approval of plans for the proposed 8" sanitary sewer in this street only between First and Seventh avenues is asked for at this time. According to the engineer, no house connections are to be made with this sewer until the construction of the trunk sewer.

The plans have been carefully examined and it is found that there is not sufficient data submitted nor on file with the Department to permit a proper consideration of the plans relative to their approval.

No plans are submitted to show the area to be served and no statement is made as to the ultimate contribution of sewage to be carried by the proposed sewer in West Seneca street, and it is, therefore, impossible to reach a decision as to the adequacy of this sewer to properly care for sanitary sewage of the district to be served by it. It appears also that the gradient of the lower section of this sewer as designed is too flat to give self-cleansing velocities and prevent clogging.

The plans, moreover, indicate that the sanitary sewer in West Seneca street either is to discharge directly into the storm water sewer in First or Hillside avenue or is to be provided with an overflow into this storm sewer. Sanitary sewage should not be allowed to discharge into the storm water system and no connections should be made between this system and the sanitary sewer system.

It appears also that the plans as submitted cannot be finally passed upon at this time or until more complete plans or additional data are submitted as to the area to be served by the proposed sanitary sewers in the entire district, inasmuch as the approval of these plans for the sanitary sewer in West Seneca street would predetermine the elevation of one of the trunk sewers in Hillside or First avenue.

In view of the above I would recommend that the plans be returned and the city engineer informed that the approval of the plans cannot be considered

until plans of the proposed sewer, revised in accordance with the suggestions embodied in this report so as to eliminate the objectionable features referred to, be submitted for approval accompanied by a short report giving:

1. The basis of design.
2. The areas to be served by the proposed sewer and trunk sewer in Hillside or First avenue.
3. The estimated ultimate population tributary to these sewers and the maximum per capita rate of contribution of sewage.
4. A statement as to whether the design of the trunk sewers in Hillside and First avenues is the result of and is consistent with studies made as to the feasibility of delivering by gravity at the disposal plant site the sewage to be conveyed by these sewers at such an elevation as to permit the operation of such works by gravity flow as far as possible.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *December* 20, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a re-examination of plans for a proposed sewer extension in the city of Oswego, Oswego county, resubmitted to this Department for approval by the city engineer, in person, on December 16, 1910.

It appears from the supplementary report of the city engineer and statements made by him at the conference in this office on December 16, 1910, that the area of the territory tributary to the proposed 8″ sanitary sewer in West Seneca street is 24.7 acres and that the design is based on an ultimate future population of thirty persons per acre contributing sewage at a maximum rate of 240 gallons per capita per day. On this basis the proposed sewer which is to have a grade of from 0.25 per cent. to 6.4 per cent. is adequate as to size and capacity to meet the future requirements of the territory to be served by it, provided that in the construction the sewer be made sufficiently water-tight to prevent excessive infiltration of ground water.

The gradient of 0.25 per cent. of the lower section of this sewer consisting of about 360′ is, however, too flat to prevent clogging. This is especially true where no facilities for regular flushing can readily be installed at an intermediate point on a sewer line as in the case of this sewer. The diameter of the sewer should, therefore, be increased to 10″ or the gradient increased to at least .35 per cent. The latter can be done either by raising the invert elevation of the first manhole above First avenue or by slightly lowering the sewer in First avenue. The latter alternative would probably be practicable since, in any event, it may be necessary to pump the sewage at the proposed disposal plant to operate complete treatment works owing to the small head available under the proposed design. The additional cost would in either case be slight owing to the comparatively short section of the sewer involved.

It was also pointed out by the city engineer that it is not proposed to provide an overflow from the sanitary sewer in West Seneca street into the storm sewer in First avenue and that the line shown upon the plans connecting the sanitary sewer in West Seneca street with the storm sewer in First avenue is simply a transit line shown upon the original tracing in red.

Although the city engineer stated in his letter of transmittal dated December 5, 1910, that no house connections would be made with the proposed sewer until the construction of the trunk sewer, the commissioner of works at the conference referred to above, asked permission to be allowed to temporarily discharge sewage directly into a small stream tributary to Lake Ontario in order that advantage might be taken of the provision of the city charter which allows an assessment, for the cost of sewers, against the property owners. He stated that he feared that if the abutting property owners did not have the use of these sewers, it would be difficult to collect any assessments from them and the construction of the sewers would be delayed.

I am of the opinion that, in order to protect the water supply of the city, no additional raw sewage should even temporarily be discharged into Lake Ontario. The prohibition of the use of these sewers until the sewage disposal plant is constructed will be consistent with your disapproval of plans for sewer extensions in West Schuyler street, Seventh, West, Oneida and other streets, pending the submission of plans for intercepting sewers and sewage disposal works in the district.

In view of the above I would recommend that the plans be approved and a permit be issued which shall contain in addition to the usual revocation and modification clauses, the following provisions:

1. That no house connections shall be made with the proposed sewer until the completion of the trunk sewer and sewage disposal plant and that the sewage to be collected by the proposed sewer shall first be passed through the proposed sewage disposal plant before it be discharged into the Oswego river.
2. That either the size of the lower section of the sewer shall be increased to 10" or the gradient be increased to 0.35 per cent.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

PELHAM

On November 11, 1910, application was received from the board of trustees of the village of Pelham in reference to plans for a proposed outfall sewer for the villages of Pelham and North Pelham, to connect with the sewage disposal plant of the town of Pelham. The plans, however, did not show sufficient details and there was not sufficient data at hand to permit of an intelligent examination of them. The plans were, therefore, returned to the designing engineer for additional details and information.

On November 30, 1910, the plans were resubmitted for approval and were approved on December 2, 1910.

ALBANY, N. Y., *November* 21, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed outfall sewer for Pelham and North Pelham, in the town of Pelham, Westchester county, submitted to this Department for approval by Harold B. Roberts, consulting engineer for the village of Pelham, on behalf of the board of trustees, on November 11, 1910.

The records of the Department in reference to plans and amendments to plans for sewerage and sewage disposal for North Pelham and Pelham Manor show that plans for these municipalities have been approved from time to time and the dates of approval of the different sets of plans were given in my reports on the examinations of plans for sewage disposal for the town of Pelham, dated July 20, 1909, and May 26, 1910, which plans provided for sewage disposal for the three villages in the town of Pelham, viz.: Pelham, Pelham Manor and North Pelham. Plans for sewers in the village of Pelham have not been approved by the Department, however, except in connection with the plans for sewage disposal in the town of Pelham.

The first set of plans for sewage disposal for the town showed that it was proposed to intercept the sewers of Pelham and North Pelham at the intersection of Colonial avenue and Wolf's lane and to carry the sewage from this point to the disposal plant, a distance of some 1,800 feet through a 36-inch pipe. The sewers of Pelham Manor were to be intercepted and the sewage conveyed from Esplanade to the disposal site by means of a 24-inch pipe.

The amended plans for sewage disposal for the town of Pelham approved on June 1, 1910, did not show the sizes of the proposed sewers, since these

latter plans merely provided for a modification of the sewage disposal works. The question of capacities of the sewers tributary to the proposed sewage disposal plant was not considered in detail, however, in connection with these plans, inasmuch as the matter of sewerage for the three villages was presented jointly by these villages in a general way and the legislative enactment which created the Pelham board of sewage disposal works simply authorized the commissioners to construct and maintain sewage disposal works for the town of Pelham, and provided that plans for the sewage disposal works prepared by them or by their engineer should show a plan for connecting therewith the sewer system of each of the villages of said town.

The amended plans for the proposed sewer system for the village of North Pelham approved on December 21, 1909, provided for an 18" trunk sewer in Wolf's lane and Iden avenue to Park place, some 300 feet from the disposal site.

The plans now under consideration show that it is proposed to intercept the sewers of North Pelham and Pelham at the intersection of Colonial avenue and Wolf's lane and to convey the sewage collected by the sewers in these villages to the disposal works by means of a 24" sewer, which sewer, according to the letter of the engineer transmitting the plans, is to be built jointly by North Pelham and Pelham. The plans also provide for the interception of the sewage from Pelham Manor in Esplanade and Daniels street.

It is, however, impossible to examine these plans intelligently, inasmuch as there are not sufficient details shown on the plans and not sufficient data submitted with the plans nor on file in this Department to pass upon them. The plans should show the sizes of all sewers and, in addition to the invert elevation of the manholes, the rate of slope of the proposed sewers between manholes. Profiles of all outfall sewers should also be submitted in accordance with the requirements of this Department.

The plans should also be accompanied by a report by the designing engineer and such report should give the basis of design, *i. e.*, the area to be served by the proposed outfall sewers, the present and estimated future population and the maximum per capita rate of contribution of sewage to be cared for by the sewers. A statement should also be submitted as to the reason for changing the size of the outfall sewer for Pelham and North Pelham from 36" to 24" in diameter, as the capacity of the former is from two to five times that of the latter, taking into consideration the gradients of the two sewers.

In view of the above, I would beg to recommend that the plans be returned and the designing engineer be asked to submit additional plans and data in accordance with the suggestions embodied in this report.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *December* 1, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following supplementary report on a reexamination of plans for a proposed outfall sewer for the villages of Pelham and North Pelham, Westchester county, resubmitted to this Department for approval by Harold B. Roberts, consulting engineer of New York city, on behalf of the board of trustees of the village of Pelham, on November 30, 1910.

These plans were first submitted for approval on November 11, 1910, but inasmuch as they did not show sufficient details and sufficient data were not submitted with them to enable the Department to pass upon the plans at that time, they were returned to the designing engineer with the request that additional data be submitted in accordance with my report on an examination of these plans dated November 21, 1910.

The plans were resubmitted for approval on November 30th, as noted above, and were accompanied by profiles and report by the designing engineer. The plans show that it is proposed to intercept the existing 10" and 15" sewer

serving the village of Pelham and the proposed 18" sewer from North Pelham at the intersection of Colonial avenue and Wolf's lane and to convey the sewage collected by these sewers to the sewage disposal works by means of a 24" sewer laid on a grade of .2 per cent. The proposed sewer has a capacity somewhat in excess of the combined capacities of the three sewers to be intercepted.

According to the report of the engineer, the area of the village of Pelham tributary to the proposed sewer is about 250 acres and that of the village of North Pelham about 230 acres.

On the usual assumptions as to population and sewage contribution, the proposed sewer should be adequate as to capacity to care for the ultimate contribution of sewage from the two villages, provided that in the construction, the sewer be made sufficiently water tight to prevent excessive infiltration of ground water and I would, therefore, recommend that the plans be approved.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

PELHAM (Town)

On May 23, 1910, plans for proposed sewage disposal works for the town of Pelham were submitted for approval by the Pelham board of sewage disposal works. These plans were approved on June 1, 1910, and a permit was issued allowing the discharge, into Hutchinson river, of effluent from the proposed sewage disposal plant.

ALBANY, N. Y., *May* 26, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for the proposed sewage disposal works for the town of Pelham, Westchester county, submitted to this Department for approval on May 23, 1910, by the Pelham board of sewage disposal works.

The Pelham board of sewage disposal works was constituted by legislative enactment which became effective May 28, 1909, and known as chapter 544 of the Laws of 1909. The law provides that the board shall be composed of three members, to be called the Pelham sewage disposal works commissioners, consisting of the presidents of the three villages in the town of Pelham, namely, North Pelham, Pelham and Pelham Manor.

The board is authorized and empowered to construct and maintain sewage disposal works for the town of Pelham, and the law further provides that the plans for the disposal works shall show a plan for connecting therewith the sewer system of each of the villages of said town.

The records of the Department show that plans for a comprehensive sewer system for North Pelham were approved on August 18, 1908, and on December 21, 1909, revised plans, providing for minor changes in alignment of the sewers in this village, were approved by this Department. Original plans for a sewer system and sewage disposal works for Pelham Manor were approved on June 29, 1894, and on April 12, 1895, plans for a change in the sewer system of Pelham Manor were approved. On September 17, 1896, plans for a change in the location of the outlet sewer were approved by the Department.

Some time after the passage of the legislative enactment which created the Pelham board of sewage disposal works, plans for a sewage disposal plant for the town of Pelham were submitted to this Department for approval and were approved on July 27, 1909. This disposal plant was designed on the concentric plan and provided for detritus tanks, septic tanks and sprinkling filter. All of the above plans for sewage disposal works were to be located in

the vicinity of the plant shown in the present plans and provided for the discharge of effluent into Hutchinson river.

The plans recently submitted for approval and now under consideration show that the proposed disposal plant is to be located on the bank of Hutchinson river at the intersection of Park place and Esplanade and meet the requirements of the law above referred to, *i. e.*, chapter 544 of the Laws of 1909, inasmuch as the plans show a plan for connecting the sewers of the three villages in the town of Pelham with the proposed sewage disposal works. These disposal works are to consist of a screen chamber, four settling tanks, two storage tanks, pump chamber, three dosing tanks and a sprinkling filter bed consisting of three units. The plant is designed to care for the sanitary sewage contributed by a future population of 8,000 persons assuming a rate of water consumption of 100 gallons per capita per day and is designed in substantial accordance with the recommendations of this Department embodied in several communications with the designing engineer.

According to the report of the designing engineer the present population is estimated at 2,500, and although the entire plant is to be constructed only two sedimentation tanks, two storage tanks, two dosing tanks and two units of the filter beds will be put in operation at present.

The sewage upon reaching the disposal works passes through a screen chamber provided with two inclined bar screens each having an available screening area of forty square feet. The bars of the first screen are spaced 1½ inches apart in the clear and the bars of the second screen are spaced one-half inch apart. From the screen chamber the sewage is carried in channels to the outside ends of the settling tanks where the amount of sewage to be discharged into each tank is regulated by weirs placed in the partitions between the channels and the settling tank.

Each settling tank is 16 feet wide by 48 feet long and is to be constructed with a triple hopper bottom for the reception of sludge. A 4-inch blow-off pipe is provided in each hopper and connected with a pump through which sludge may be discharged at any time to the adjacent sludge disposal field without emptying the tank.

The total capacity of the four settling tanks is about 190,000 gallons, which is equivalent to six hours' flow of sewage on the basis of 800,000 gallons daily flow.

From the sedimentation tanks the sewage passes over adjustable weirs to channels leading to the storage tanks having a combined capacity of some 1,800 cubic feet. It appears that only one of these tanks is to be used at a time and the effluent from the sedimentation tanks can be diverted into either of the two tanks by means of flash boards. The storage tanks are to be provided with an automatic float arrangements for starting and stopping the two 5-inch centrifugal pumps located in an adjacent dry pump well. The pumps are designed to discharge 600 gallons per minute each, which is equal to the estimated maximum flow of sewage for which the plant is designed to treat and are to be operated by induction motors connected with the current from the municipal lighting plant. An auxiliary power plant consisting of a gasoline engine and generator will supply the electric current for the motors to drive the pumps in case of emergency.

The sewage from the storage tanks will be discharged to an overhead feed trough leading to three truncated pyramidal-shaped dosing tanks located directly above the storage tanks. The sewage is to pass into these dosing tanks simultaneously over adjustable weirs. Each tank has a capacity of about 5,700 gallons and is provided with an 8″ automatic siphon which discharges into the distributing system of the sprinkling filter. One dosing tank supplies one of the three units of the sprinkling filter.

The filter has a total area of about .55 acres and is to be filled to a depth of six feet with broken stone varying in diameter from 2 to 2½ inches. At a daily rate of contribution of 800,000 the sprinkling filter will be required to treat settling tank effluent at the rate of 1,500,000 gallons per acre per day.

The sewage or effluent is to be applied to each unit of the filter by means of seventy-two spraying nozzles spaced 10.4 feet on centers and designed to give a square distribution. These nozzles, being supplied by a gravity flow

from the dosing tanks, will tend to give a uniform distribution of sewage over the surface of the filter area under a dropping head. The net pressure head at the nozzles will vary from about 0.5 to 6.5 feet, and under these conditions each nozzle is to have an average rate of discharge of about fifteen gallons per minute. At this rate of discharge each dose will be applied to the filter in about six to seven minutes and allow a period of rest of about twenty-seven minutes for an average rate of contribution of 800,000 gallons per day, which is the amount of sewage the plant is designed to treat properly.

The sprinkling filter is to be thoroughly underdrained by means of 8-inch horseshoe tile, and 8-inch tile vents spaced five feet on centers are to be placed along the east side of the filter for the purpose of ventilation. The effluent collected by the underdrains is to be discharged into Hutchinson river.

In conclusion, I beg to state that the plans have been carefully examined and show that the proposed sewage disposal works are well balanced as to design and should produce a satisfactory effluent if properly constructed and operated.

I therefore recommend that the plans be approved and a permit be issued allowing the discharge into Hutchinson river of effluent from the proposed sewage disposal works.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

POUGHKEEPSIE

On February 7, 1910, application was received from the board of public works of the city asking for the approval of plans for sewer extensions in Innis avenue, Dwight, South White and Cherry streets, and Fox terrace. These plans were approved on February 8, 1910, and a permit issued allowing the discharge, into the Hudson river, of sewage from the proposed sewers.

On October 25, 1910, plans for a proposed sewer extension in North Clinton street were submitted for approval by the board of public works. These plans were approved on October 31, 1910, and a permit was issued allowing the discharge of sewage into the Hudson river from the proposed sewer.

ALBANY, N. Y., *January* 31, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewer extensions in the city of Poughkeepsie, Dutchess county, submitted to this Department for approval on January 18, 1910.

The records of the Department show that plans for combined sewers within the present sewer districts of the city have been approved from time to time during the past two years. The plans now under consideration show about 4,000 feet of 12-inch sewer extensions in Dwight street, Innis avenue, South White street, Fox terrace and Cherry street.

The plans show that the sewer in Innis avenue is to be a sanitary sewer, while the proposed sewers in Dwight street, South White street, Fox terrace and Cherry street are to be constructed on the combined plan with provisions for future separation of sanitary sewage and storm water in Cherry street.

The proposed sewers have sufficient grades to produce self-cleansing velocities and are satisfactory as to other engineering features, and I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of sewage into the Hudson river.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *October* 31, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed sewer extension in Poughkeepsie, Dutchess county, submitted to this Department for approval by the board of public works on October 25, 1910.

The plans show that it is proposed to construct a 12" and 15" sewer in North Clinton street from a point about 375 feet north of the C. H. Park entrance to the railroad crossing under Clinton street between Cottage and Oakley streets. From this point two routes are shown, one across private property to Hamilton street; the other (which, according to the Superintendent of Public Works, is the one to be constructed) under the tracks of the Central New England railroad to the existing sewer in Cottage street at the intersection of Clinton street.

The sewer is to be carried under the tracks by means of an inverted siphon which is to consist of 75 feet of 20" vitrified tile pipe with a manhole at each end. The difference in elevation of the inverts of the sewer at the manholes at the beginning and end of the siphon is about 2.2 feet.

The plans have been carefully examined by the engineering division and found to be satisfactory and adequate for future requirements for sanitary sewage of the district to be served by the proposed sewer, provided the sewer is carefully constructed especially with reference to the inverted siphon.

I, therefore, beg to recommend that the plans be approved and a permit issued allowing the discharge into the Hudson river of sewage to be collected by the proposed sewer.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ROCHESTER

On March 1, 1910, plans for proposed intercepting and outfall sewers and for sewage disposal works for the city of Rochester were submitted for approval by the city engineer.

These plans were, however, not approved and were returned to the city engineer for amendments and modifications with respect to time of detention and arrangement of outlet, on July 26, 1910. The plans were resubmitted for approval on August 20, 1910, after having been revised in general accordance with the recommendations embodied in the report, dated July 18, 1910, on an examination of the first plans presented.

The revised plans were approved on September 22, 1910, and a permit was issued allowing the discharge into Lake Ontario of effluent from the proposed sewage disposal works.

ALBANY, N. Y., *July* 18, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report covering my examination of the plans for proposed intercepting and outfall sewers and for sewage disposal works for the city of Rochester, Monroe county, submitted for your approval on March 1, 1910:

The plans submitted comprise duplicate copies of the following:

1. Map of Rochester and vicinity.
2. Proposed intercepting sewer and main sewer outlets from Central avenue to Driving Park avenue.
3. Proposed intercepting sewer from Driving Park avenue to Strong and Hollenbeck streets, showing connection with Lake avenue outlet.
4. Profile of intercepting sewer from North Water street to Hollenbeck street.

5. Profile of proposed connections from the West Side Trunk sewer to Avenue B.

6. Profile of proposed connection with Lake avenue outlet sewer.

7. Profile of Main Trunk sewer from Norton and Hollenbeck streets to sewage disposal works and of outfall sewer from sewage disposal works to terminal crib in Lake Ontario.

8. Topographic plan showing Main Trunk sewer, disposal works and farm of Edward Harris and lands adjacent thereto.

9. Plan and sections of disposal works.

10. Special Rochester sheet of United States Geological Survey, showing location of proposed outfall sewer.

11. Plan and sections of overflow chamber at north end of Mill street tunnel.

12. Plan and section of terminal crib on discharge pipe in Lake Ontario.

The following reports and documents were also submitted:

1. The report of Emil Kuichling, consulting engineer on the proposed Trunk sewer for the east side of the city of Rochester, dated April 29, 1889.

2. The report of Emil Kuichling, consulting engineer on the disposal of the sewage of the city of Rochester, dated February, 1907.

3. Notes on sewage disposal, supplementing the report on the disposal of the sewage of the city of Rochester, made on February 1, 1907, by Emil Kuichling, consulting engineer, dated March 21, 1910.

Rochester is a city of the first class, situated in the northern central portion of Monroe county on the Genesee river, the northerly boundary of the city being five miles from Lake Ontario, and the southerly boundary about eleven miles from the lake.

The population of the city, as given by the United States and New York State census from 1875 to 1905, is as follows:

1875	1880	1890	1900	1905
81,722	89,366	133,896	162,608	181,666

Mr. Kuichling estimates that in 1925 the population of the city will be 260,000, and to this he adds a population of 15,000 in the districts of the towns of Gates and Greece, adjoining the westerly city line, which will naturally be served by the city sewer system and will probably ultimately be included within the city limits. This gives a total population of 275,000 as the basis for the design of the intercepting sewer and disposal works.

A study of the population statistics for the city shows that the rate of growth has been comparatively uniform, and the estimated population of 275,000 in 1925, given by Mr. Kuichling, appears to be a reasonable and proper one. If the above estimate for 1925 be extended ten years with a corresponding rate of increase, but with a somewhat greater allowance for density of population in the section west of the city, which would naturally be tributary to the city sewer system, the population of the city in 1935 would be approximately 325,000.

The total area within the present city limits is 12,627 acres, of which 1,313 acres are parks, cemeteries, rivers, canals, etc., and 794 acres comprise the new portion of the city, formerly the village of Brighton. This latter section is provided with a separate sewer system, plans for which were approved by this Department on October 24, 1907, the sewage being collected in a system of separate sewers and pumped into the east side trunk sewer at University avenue. Since the natural slope of this district is toward Irondequoit bay it is proposed to treat the sewage from this district in a separate sewage disposal plant having an outlet into Irondequoit bay.

From the above statement as to areas it will be seen that the habitable area lying within the city limits tributary to the proposed intercepting sewer is 10,520 acres. Outside of the city limits there are also tributary to the intercepting sewer system about 5,500 acres in the town of Gates, and some 300 acres in the town of Greece. These give a total of some 16,000 acres as tributary to, and to be served by, the proposed intercepting sewer.

The city water supply is derived from Hemlock lake which lies 26 miles due south of Rochester and has a catchment area of 43 square miles, with a lake surface of about 3 square miles. The construction of the water-works was commenced in 1873. There is one storage reservoir 9 miles south of the city and two distributing reservoirs near the southerly city line. Two conduits, the last one completed in 1894, convey the water to the distributing reservoirs whence it is distributed to the consumers. It is expected in the future that the present source of water supply will have to be supplemented by additional sources and it is possible that the city may be forced to secure a supply from Lake Ontario, in which case the intake would probably be selected at some point west of Manitou Point.

Sewer construction in the city of Rochester dates back as far as 1829. Many of the sewers are, therefore, quite old and, with the exception of those recently laid in the Brighton district, practically all are constructed on the combined plan. At the present time there are some eight different outfall sewers which discharge into the Genesee river north of the upper falls, two of which discharge immediately below the upper falls, and the remaining six at various points between the upper falls and the northerly city line. These outfall sewers consist of vertical shafts and short tunnels, or steel pipes leading down the sides of the river gorge, through which the sewage is discharged into the river. The two more important of these outlet sewers are on the east side and west side trunk sewers. The former, completed in 1893, and receiving the sewage from the east side sewer district, discharges into the river opposite Norton street; and the latter, receiving sewage from the town of Gates, discharges into the river just below the lower falls.

The Genesee river rises in Potter county, Pennsylvania, and after entering New York State flows through and between the counties of Allegany, Wyoming, Livingston and Monroe to Lake Ontario. The river has an average fall of 14 feet per mile from its source to its mouth and drops 264 feet in passing through the city of Rochester. There are three falls within the city limits, the upper, 100 feet in height, being located at about the middle point of the city, and the middle and lower falls being located 1¼ and 1½ miles northerly, with heights of 30 feet and 100 feet, respectively. The drainage area of the river is about 2,500 square miles. Based on the 1905 census the average population per square mile, Rochester excluded, is 55, and if Rochester is included the average population per square mile is 128.

The minimum monthly flow of the Genesee river at Rochester during ordinary years, according to Mr. Kuichling's report, is 300 cubic feet per second or 0.127 second feet per square mile of drainage area. This flow is based on records of discharge at the Court street dam in the city of Rochester, kept by the city engineer since 1893, a few gaugings made by the United States Geological Survey in 1903, and other gaugings. It is also stated in this report that for several weeks during severe droughts the average flow will not exceed 200 cubic feet per second or about .085 second feet per square mile.

Gaugings made by the State Engineer, in co-operation with the United States Geological Survey at the Elmwood avenue bridge at the southerly city line, commenced in March, 1904, show the lowest mean monthly runoff to be 0.156 second feet per square mile during the years 1904 to 1907, inclusive. This corresponds to a flow of about 360 cubic feet per second.

It is evident, therefore, that the average flow in the Genesee river, at Rochester, during the dry season, is ordinarily not greater than 300 cubic feet per second. This is equivalent to a flow of 1.5 cubic feet per second per 1,000 persons for the present population, and a flow of slightly less than 1 cubic foot per second per 1,000 persons for the estimated population of 325,000 in 1935. Without entering into a detailed discussion, it is evident that this flow is insufficient, according to accepted standards, to prevent a nuisance in the river even at the present time, a fact that is borne out by observation of the condition of the river at almost any time during the summer season.

The plans now before the Department comprise a system of intercepting and main trunk sewers for the collection of the sewage of the city and its conveyance to the proposed sewage disposal works; sewage disposal works consisting of detritus tanks and revolving screens located about ½ mile

south of Lake Ontario and about 3 miles northerly from the northerly city line; and an outfall sewer extending from the sewage disposal works into Lake Ontario to a point 7,000 feet from shore.

The proposed intercepting and main trunk sewers, some sections of which are in tunnels, some in open trenches, and others inverted siphons, extend from the intersection of North Water street and Central avenue to the sewage disposal plant near Lake Ontario, a total distance along the line of these sewers of about 7.5 miles.

The first tunnel begins at a shaft at the intersection of North Water street and Central avenue and crosses the Genesee river under Central to Mill street, whence it passes through Mill street and thence through property of the Rome, Watertown and Ogdensburg railroad and Cliff street to a manhole at the top of the west bank of the Genesee river near the Rome, Watertown and Ogdensburg railroad bridge. This tunnel has a total length of about 5,600 feet and is provided with 12 shafts, located at intervals of from 100 to 700 feet.

At the intersection of North Water street and Central avenue the tunnel is to intercept the outlet sewers of the two Central avenue sewer districts, and the outlet sewers of three additional sewer districts are to be intercepted by the tunnel as follows: The Front street district at Central avenue near Front street; the Genesee Valley canal district at the intersection of Mill and Factory streets and the Spencer, Lyell and Saxton streets districts at the intersection of Spencer and Cliff streets. All but about 400 feet of this tunnel section is to be constructed through rock. Along this section of the intercepting sewer there will be located five storm water overflows into the Genesee river.

From the manhole near the Rome, Watertown and Ogdensburg railroad bridge the sewage will be carried through two iron pipe inverted siphons, carried down the west bank of the river under the river, and along the east bank of the river to a manhole near the intersection of Park driveway and Avenue B. This inverted siphon is some 3,200 feet long and is provided with a blow-off at the water's edge at the east bank of the river.

From the end of this inverted siphon the intercepting sewer will be constructed in a second tunnel, some 3,100 feet in length, provided with five shafts. It is proposed to extend the West Side Trunk sewer across the river through two iron pipe inverted siphons and to discharge the sewage carried by this sewer into the tunnel section of the intercepting sewer at Avenue B, at which point the outlet sewer from the Avenue B sewer district is also intercepted. An overflow sewer into the river is also to be located at this point.

The final section of what has been considered for clearness, the intercepting sewer, extends from the tunnel to the Main Trunk sewer at the intersection of Strong and Hollenbeck streets. The length of this section is about 2,900 feet and will be five feet in diameter constructed in open cut.

The Main Trunk sewer, which will extend from Norton street to the disposal plant, will begin at the intersection of Norton and Hollenbeck streets where the East Side Trunk sewer is to be intercepted, and will extend to the sewage disposal works located about ½ mile from the lake and nearly 5 miles from Norton street, measured along the line of the sewer. Although this section is designated for convenience, the Main Trunk sewer, it does in fact intercept the sewage from the Lake avenue sewer district, which is carried across the river through an iron pipe siphon to a pumping station located on the east bank of the river and discharged into the Main Trunk sewer at St. Paul street near the city line. The Main Trunk sewer varies in diameter from 3′ 6″ to 6′ and follows an irregular route through public highways and private property to the disposal plant, discharging at an elevation of 68 feet above high water level of the lake.

The water consumption in 1890 was 63 gallons per capita. After the new conduit was laid in 1894 the water consumption increased to 77 gallons per capita in 1895, and gradually increased from that time to 87 gallons per capita in 1904. The present design assumes a water consumption of 100 gallons per capita.

The Main Trunk sewer below the last proposed intercepting sewer ranges in diameter from 4′ 3″ to 6′, with slopes ranging from 1.18 per cent. to 0.186 per cent., and velocities ranging from 11 feet to 6.5 feet per second when running full. Although the different sections of the trunk sewer vary somewhat in capacity this sewer will carry 100,000,000 gallons per day when flowing full. This capacity is adequate to convey sewage to the disposal works at a rate of about 500 gallons per capita for the estimated present population of about 200,000 persons; 360 gallons per capita for 275,000 persons, and 308 gallons per capita for 325,000 persons, the two latter populations being the estimated populations which will contribute sewage in the years 1925 and 1935, respectively.

It is assumed, as stated above, that the average daily contribution of domestic sewage will be 100 gallons per capita, ordinarily. During certain seasons of the year and during wet weather this average daily flow may be increased to from 125 to 150 gallons per capita. On this basis the trunk sewer leading to the sewage disposal works will have a surplus capacity for the conveyance ot a portion of the storm water flow to the extent of from 150 to 175 gallons per capita when the population is 325,000.

The outfall sewer leading from the sewage disposal plant will consist of a steel pipe 5 feet in diameter and about 9,400 feet long, 7,000 of which will be laid in a trench on the bottom of the lake. The last 50 feet of the 5-foot steel outfall sewer terminates at a crib 50 feet by 30 feet in plan and 20 feet deep, designed to protect the end of the pipe from injury by ships, anchors, etc. The bottom of this crib will thus be some 8 feet below the bed of the lake and 58 feet below the water surface of the lake, and will be filled with stone to hold the crib and inclosed outlet section of the steel pipe firmly in place. This outfall sewer will terminate at the crib in a vertical reversed curve which will bring the invert of the end of the pipe about 5 feet above the lake bottom and about 45 feet below the surface of the water.

The sewage disposal works comprise six detritus tanks, each provided with two screens, one a flat iron bar screen placed at the inlet end of each tank, and the other a revolving screen placed in the outlet channel from each tank.

The flow from the trunk sewer leading to the plant is to be carried by two diverging channels constructed in concrete across the ends of the six detritus tanks. From these two main channels, separate channels 2′ 6″ wide and 7′ deep lead to each tank. At the entrance to each tank each of these separate channels subdivides into three outlets, two of which are 24″ pipes, one leading from each side of the channel to carry the flow from the bottom of the channel around to the quarter points of the end of each tank, while the third outlet has its bottom raised about two feet and discharges liquid from the upper part of the channel.

About five feet from the entrance end of the tank a flat iron bar screen extends across the tank. This screen is set at an angle of about 20 degrees from the vertical, and the lower edge rests on a concrete bench extending from the end of the tank ten feet below the top of the tank and eight feet below the flow line of the tank.

Each tank is 57 feet long, 16 feet wide at the top and 6 feet wide at the bottom and has a bottom slope of about 1″ per foot of length toward the sludge pipe inlet. The side walls are vertical for a depth of 4 feet below the flow line (6 feet below the top of tank), and the depth of flow in the tank ranges from 11 feet near the outlet end to 14 feet over the valve of the sludge pipe situated 12 feet from the inlet end.

An 18″ sludge pipe with hand operated stop valve leads from a point at the bottom of each tank on the center line and 12 feet from the inlet end to a sludge sump built in the end wall of the tank, the bottom of this sump being 4 feet below the bottom of the tank.

The plans show a revolving screen in the outlet channel from each detritus tank. This channel is 6 feet wide and the bottom is 4 feet below the flow line except for a curved depression of 18″ under the revolving screen. The revolving screen is placed with its axle about 8 feet from the detritus tank and consists of a pair of circular end frames 12′ 8″ in diameter, connected by 5 radial blades of wire cloth having approximately 1/10″ openings and ex-

tending across the channel. The screen is to rotate so that its blades revolve against the flow of sewage, and appliances are to be provided for automatically removing the materials caught and retained on these screens.

The capacity of each tank is about 9,000 cubic feet, or about 67,500 gallons, giving a total capacity for the six tanks of about 400,000 gallons. The time of detention of sewage in the detritus tanks, on the basis of 100 gallons per capita daily from a population of 210,000 (slightly more than the present estimated population), is about 28 minutes. On the same basis of sewage contribution per capita the time of detention in the tanks of sewage from a population of 275,000, as estimated for 1925, will be 21 minutes, and for a population of 325,000, estimated for 1935, the time of detention will be 18 minutes. Based on a daily flow of 100,000,000 gallons, or the capacity of the lower section of the Main Trunk sewer, the period of detention in the detritus tanks, as proposed by the design, is about 5 minutes, and the average velocity of flow through the tanks will be about 1/6 foot per second.

It is evident, therefore, that the time of detention in the detritus tanks during times of storm, when the flow in the trunk sewer approaches a rate of 100,000,000 gallons daily, will be only about one-fifth the time of detention which occurs during periods of no rainfall. When the flow in this trunk sewer would exceed 100,000,000 gallons per day as a result of storms raw sewage will be discharged into the Genesee river, and the relative amount of such sewage overflow will depend largely upon the excess rainfall at such times.

Having thus outlined somewhat in detail the proposed works for intercepting and disposing of the sewage of Rochester, let us now inquire into the question of adequacy and efficiency of these methods in fulfilling the requirements of a satisfactory and safe collection and disposal of this sewage, not alone in relation to meeting the requirements of the city of Rochester, but to the general welfare of the other municipalities situated along Lake Ontario that may in any way be affected. Since this is one of the first instances of the presentation of a comprehensive plan for disposal of any considerable volume of sewage into Lake Ontario that has been submitted for your approval, and owing to the relatively large population and volume of sewage to be discharged into the lake the case constitutes an important, if not a leading one, at this time, and consequently a most careful consideration should be given the many factors and interests that are necessarily involved.

To do this fairly, and to keep clearly before us only the important principles and factors involved, it will be well, even at the cost of slight repetition, to state briefly the essential features of the design, viz.:

1. The collection of the sanitary sewage, together with a limited amount of the storm water, in a system of intercepting sewers, and the conveyance thereof through a trunk sewer to disposal works situated about 3 miles north of the city and about ½ mile from the lake front.

2. The treatment of this sewage by passing it through a series of settling tanks having capacities sufficient to retain the sewage in them for periods ranging from 5 to 28 minutes and with velocities ranging from 1/6 to 1/33 foot per second, whereby opportunity will be given for a settlement or precipitation of portions of the heavier grit and suspended particles in the sewage, and the removal of portions of grease and floating matter.

3. The passage of the effluent from these tanks through fine screens having openings of 1/10″, for the purpose of removing all coarse and fine suspended matters not previously removed by settlement, which will be caught or retained by screens of this mesh.

4. The conveyance of this partially clarified sewage from the settling and screening plant through a long outfall sewer 5 feet in diameter, laid beneath the bed of the lake to a point of discharge some 7,000 feet from shore and in 50 feet of water where, through combined physical agencies of dilution, sedimentation and dispersion, and through natural chemical and biological changes induced by bacteria and other and higher aquatic organisms, the final purification of the sewage will take place.

It will be seen, first, that the plans propose an interception of only a

portion of the sewage which now discharges into the Genesee river in so far as that during storms, which exceed a certain rate, a portion of the sewage, diluted with varying proportions of rainfall, depending upon its intensity, will overflow into the Genesee river. Upon strictly sanitary grounds this overflowing of sewage is, in general, an objectionable feature, but since most of the sewers of Rochester were constructed many years ago before a separation of sewage from surface water was practiced to any considerable extent, and before the advantages of this separation were realized, it would be very costly, if not almost impracticable, to change this system at this time.

Again, the raw river water below Rochester cannot be considered potable and a suitable source of water supply. With the question of water supply thus eliminated it is very unlikely that any nuisance of a serious nature would ever be experienced by the overflow of highly diluted sewage during times of storms if these overflow pipes are properly extended out into the channel of the river and submerged at their points of discharge. Occasionally, during short rain storms in the summer months, overflowing may occur before the increased flow in the river resulting from the rainfall has been felt, and at such rare and short intervals it is possible that objectionable conditions might be noticeable.

Whereas, then, the existence of these combined sewers, involving necessarily an overflow of sewage into the Genesee river during storms, must be considered in general an unavoidable objection in connection with any method of disposal of the sewage of Rochester, it is in my opinion not a serious one, for it is highly improbable that any local nuisance will occur at any time even in the immediate vicinity of these outlets. I do believe, however, that all future extensions to the Rochester sewage system in new outlying districts, especially where independent sewage disposal plans have to be installed and maintained, with outfalls into smaller streams, should, for sanitary, as well as economical reasons, be constructed on the separate plan.

Considering the other main features of this project outlined above under (2) to (4) inclusive, relating to the more specific question of the treatment or purification of the sanitary sewage, it will be well to first discuss generally, but briefly, the essential factors and requirements of any system of sewage purification; for it is only following a thorough knowledge of such requirements and a comparison with experience in other cases that a satisfactory opinion concerning the efficiency or adequacy of a method of sewage disposal for any particular community can be reached.

Generally speaking, when the discharge of sewage upon land or into water becomes objectionable or dangerous it is a result of the following important ingredients or characteristics, viz.:

1. The suspended matter, especially the grosser solid, which may, under certain conditions, cause deposits near the point of discharge, offending not only sense of sight but possibly of smell; and under other conditions may be carried considerable distances from point of discharge, and cause offense in other ways. Owing to this tendency of being more easily carried greater distances by wind and water action, these grosser solids which harbor and protect the life of dangerous organisms contained within and upon them must consequently be regarded not only an offensive, but a dangerous ingredient of sewage.

2. The dissolved and colloidal matter, especially the more quickly decomposable portion which, under certain conditions of supply of oxygen, become putrefactive and give off noxious gases, and thus become offensive to sense of smell.

3. The bacteria, a large percentage of which are of intestinal origin, and many of which may be pathogenic, which may be the vehicles of transmission of disease and cause of epidemics. These bacteria may travel considerable distances from the point of discharge under unfavorable conditions of winds, wave action and water currents, and at such times a menace or actual danger may result, if the distance of travel comes within range of some unprotected water supply or other influence, whereby infection may be transmitted to people.

Whereas the above characteristics are by no means a complete list of objectionable qualities of sewage discharged, under such conditions, they do represent the more important ones in so far as they relate to the case of Rochester. It is, therefore, essential to consider more closely the effects or the efficiency of the successive means or stages of the purification process proposed in the removal of these objectionable conditions.

According to the plans it is proposed to give the sewage first a preliminary treatment by passing it through a series of tanks provided with screens and skimming boards, in order to settle out the grosser and heavier solids, to skim off the lighter floating grease or oils and to screen out the floating and suspended grosser solids. The effect of this treatment will be to remove from the sewage one of its most objectionable features, i. e., the floating or depositing solids which offend the sense of sight and smell, and which under unfavorable conditions of wind and wave action may become dangerous as a result of the relatively greater distance to which these grosser and, at times germladen, solids may be transported.

It is evident, however, that this treatment will not accomplish a complete removal of objectionable matter in the sewage, and that there will remain in the effluent from these settling and screening chambers:

1. The finer and less visible suspended matter which does not of itself settle, or which is not entrained with coarser matters which settle in the tanks; or is not removed by entrainment of coarser solids in passing through the screens.

2. Practically all of the soluble and colloidal organic matter, and that portion of the suspended organic matter not removed by settlement and screening.

3. A very large percentage of the original bacteria and disease germs not attached or contained in the removed solids, or not removed by entrainment with these solids during settlement or screening.

After treating the sewage in these settling tanks it is then proposed to finally dispose of the effluent, which will contain these residual but still somewhat objectionable ingredients referred to above, by conveying it through a long outfall pipe out into Lake Ontario, and discharge it into the waters of the lake 7,000 feet from shore, at the bed of the lake, some 50 feet below the surface, where it will be subjected to the natural processes or agencies of purification that will take place under such conditions. The nature of these processes and their effects in purifying the sewage effluent thus discharged are unquestionably many and complex, are variable as a result of changeable conditions of wind, temperature and other atmospheric factors, and the volume and character of the effluent; and owing to these variable influences, and the limited information concerning the experiences of other municipalities similarly situated, are somewhat difficult and uncertain of close formulation or estimation. The general principles of engineering, chemistry and biology in regard to these phenomena are, in my opinion, sufficiently and definitely known and established, and a sufficient number of similar or analogous cases in practice are, in my opinion, available to enable one to judge approximately, or at least to estimate, within sufficiently close limits, the probable effects that will be produced by the discharge of this partially treated sewage into the lake under the conditions proposed.

There is little doubt in my mind that the following phenomena or changes will take place following the discharge of the sewage effluent from the proposed disposal works into the waters of the lake 7,000 feet from shore in 50 feet of water:

1. A settlement of a portion of the fine, suspended and possibly colloidal solids upon the bed of the lake around the outlet for a varying but limited distance, due to the relatively greater specific gravity resulting from a dilution with the lighter lake water and the lowering of temperature while passing through the outfall pipe.

2. A general diffusion and dispersion of the portion of the liquid sewage through the lake waters surrounding the outfall, due to currents induced:

(a) By differences in specific gravity of the sewage and lake water;

the sewage being, by reason of its dissolved matters, of greater specific gravity than lake water; but, owing to the relatively higher temperature which it may possess at times, due to unusual changes in temperature of lake water and to relative loss of heat of sewage passing through the outfall (which would vary at times according to its volume and the time consumed in passing through the outfall), lighter than lake water.

(*b*) Through wind action which at times will stir the lake to a considerable depth, although this agitation may not ordinarily extend to the depth of the outfall pipe.

(*c*) By currents of lake water along and over the pipe line, in reverse direction to the flow of sewage in the pipe, due to the heat of sewage transmitted through the pipe, and covering of earth, to the lake water immediately over the pipe line.

(*d*) Rising gas bubbles due to septic action of solids deposited around outfall.

3. A gradual diffusion and dispersion, throughout the body of lake water surrounding the outfall, of the fine suspended and colloidal matter whose net specific gravity (*i. e.*, the natural, corrected for changes due to temperature and dilution of sewage in lake water) is about equal to the mixture of lake water and sewage.

4. A rising to the surface of fine suspended and colloidal matter whose net specific gravity (*i. e.*, the natural, corrected for changes due to temperature and dilution of sewage with lake water) is less than that of the mixture of lake water and sewage.

5. A transporting of the sewage and any suspended matters which have diffused or risen to the surface of the lake from the outfall to varying distances therefrom as a result of natural lake currents or currents induced by wind action. This transportation, or travel, will be generally oscillatory, governed almost entirely by direction of the wind, since currents of translation through lake are relatively insignificant and the distance of travel will depend upon the intensity and duration of wind from any one direction.

6. A slow but progressive decomposition due to septic, or anaerobic bacterial action, of any solid materials deposited around the outfall.

7. A slow but progressive oxidation of the liquid organic matter either contained in the sewage effluent as it is discharged from the outfall, or derived from a liquefaction of the solids surrounding the outlet as a result of anaerobic bacterial life in the presence of sufficient oxygen carried in the lake water and replenished continuously from the atmosphere above as it is exhausted.

8. The consumption as food of the suspended organic matter, both living and dead, by small aquatic organisms which are, in turn, successively devoured by larger ones.

9. A gradual destruction of the original bacterial and disease germs contained in the sewage resulting from adverse environment, antagonism of species, settlement upon bottom of lake and consumption as food by higher forms of living organisms.

Although the above may not be a complete statement of the complex phenomena that take place from a physical, chemical and biological standpoint, it includes nevertheless the more important phenomena upon which judgment as to the efficiency of this proposed means of disposal can be adequately based. These phenomena, complex and variable as they are, show what is daily being clearly demonstrated by experience, and what we are daily learning better to understand, that purification does take place when sewage is discharged under favorable conditions into large bodies of water.

The prime and ultimate aims of any method of purification are the removal of objectionable suspended matters, the oxidation of the organic matters, and the destruction of bacteria. This purification is accomplished on land where sewage is allowed to filter or percolate over or through soil or sand in the presence of a sufficient supply of oxygen and the nitrifying organisms

which harbor upon the soil grains. It is accomplished more economically, but no less positively nor, under favorable conditions, less completely though perhaps less rapidly, when sewage is discharged into sufficiently large bodies of water charged, and replenished, with dissolved oxygen. Indeed, just as artificial means of purification on land, by means of sand filters, contact beds and sprinkling filters, are able to remove large portions of suspended matters in the sewage, oxidize and make stable the organic matters and destroy a relatively large number of original bacteria, leaving portions of each unremoved or unoxidized; so is the method of purification by means of discharge into large bodies of fresh water supplied with oxygen and organisms of nitrification, able to accomplish a similar removal of suspended matters, nitrification of organic matter and destruction of bacteria, through the agencies of sedimentation, septic action, oxidation and the consumption as food by higher forms of aquatic life.

The significant and important question in any case is whether local or artificial conditions of purification are favorable, and whether they are such that these processes of elimination and oxidation can be attained without the production of nuisance and without danger to public health; and since these conditions may vary considerably in different cases, especially if the purification is a natural one, it follows that each case represents a local problem in itself, and must be considered and judged individually and independently.

In the case before us of the discharge of a sewage partially clarified by settlement and screening into a vast body of pure water practically saturated with oxygen, with ample opportunity for replenishment as this dissolved oxygen is absorbed and utilized for the nitrification of the organic matter, we have *in principle*, and in relation to the local conditions which exist, a method of disposal that may be considered most favorable. That is, as to adequacy, the method and disposal proposed will leave no coarse suspended matter to carry offense and danger to distant shores through wind and wave action; the finer suspended and colloidal matters will be so minute that if deposited on the bottom of lake or outlet will be readily disintegrated or hydrolized by septic action, or, if dispersed into the body of water around the outlet, will be attacked by the aerobic bacteria and even higher forms of life and be either nitrified or consumed as food; the outlet will be so far distant from shore that large quantities of oxygen will be supplied from the vast volumes of fresh lake water which will pass progressively or oscillate back and forth over the outfall, the spent dissolved oxygen carried by the lake waters being replenished by absorption from the air at the water surface.

That the purification by this method of disposal will not be complete, even within a considerable distance of the outlet unless important modifications and changes are made in accordance with recommendations which will be given later, there can be little question in my opinion. Indeed, there may be, and possibly will be at times, notwithstanding these important changes, some discoloration or other slight offense in the immediate neighborhood of the outfall. That any such nuisance will after these recommended changes in the proposed plans are carried out ever extend to any appreciable distance from the outfall. or that any traces of sewage will be noticeable along the shores of Lake Ontario, is in my opinion very unlikely.

It is improbable that with the modifications in plans later recommended, even under refined methods of testing, any chemical traces would ever be detected along the shores of the lake even under unfavorable conditions of wind and wave action. That biological traces would ever be detected is quite possible and even probable. That any such traces would be less discernible along the shores of the lake after these works were in operation than are discernible now, with the crude sewage of the city discharged into the river and thence into the lake, is, in my opinion, almost certain.

There are, however, certain local considerations such as the possible contamination of the water supplies of the Rochester and Ontario water companies and of the Charlotte waterworks, which is taken from the lake a short distance west of the mouth of the Genesee river, and the possible danger to health of bathers along the shores of the lake, which must not be overlooked. Without going into a detailed discussion of these questions, it may be said

first, in reference to the safety of these two supplies, that the sewage now carried by the Genesee river and discharged into the lake near the intake carries more pollution to these intakes than will be taken there after the sewage now discharged into the river and in turn into the lake is diverted from it and discharged at a point in the lake further removed, where the river currents freed from sewage will tend to create a barrier against any pollution crossing these currents, and after the sewage has been treated in accordance with the proposed plans and the recommended changes and modifications made later in this report. Futhermore, with satisfactory maintenance and operation and with suitable extensions to the present water filters, especially in view of the lessened pollution of the water reaching the intake after the sewage is diverted from the Genesee river, it is my opinion that this supply will be adequately protected against danger from sewage discharged from the proposed outlet in the lake.

In regard to health of bathers along the shores of the lake, it must be borne in mind that there will be other dangers to the health of these bathers than from the sewage from the proposed outlet in the lake, such, for instance, from the local contamination resulting from the washings and the occasional accidental or wilful discharge of excreta from the bathers themselves. Further, it must be remembered that any pollution that may reach the shores under adverse conditions of wind and wave action would occur at a time when people would be unlikely to be bathing. In all probability any danger to health of bathers resulting from sewage from outfall would, if the recommendations for changes in these plans are carried out, be no greater and in all probability less than that for arising from the washing from the bathers, and it is, therefore, my opinion that the possibility of danger from this source is, from a practical standpoint, so remote as to be negligible.

In regard to the water supply of Oswego there can be little question that after the consummation of the proposed project traces of sewage will be carried to a greater distance in the direction of Oswego's new intake than now occurs. It is highly improbable, however, that even traces of sewage will ever reach this intake following the discharge of sewage into the lake. If it ever did reach this intake, it is my opinion again that its relative intensity will be negligible compared with the sewage pollution resulting from the sewer outfalls of the city of Oswego, or from the pollution carried by the Oswego river which flows into the lake only a relatively short distance from its water supply intake and which, as shown by the reports of their consulting engineers, will reach the intake during certain unfavorable periods of wind action.

There are three features in connection with this plan which are of especial importance and which should not be overlooked. One is the relatively brief period of detention of the sewage in the settling and screening chamber, another the lack of provision for discharging the sewage in the lake at more than one point, and the third the lack of provision for extending the outlet further out into the lake.

Concerning the first of these omissions it appears that the detention period for the sewage during the early years following the completion of the works will range from one-half to one-third of an hour. This period is much shorter than that which conservative practice has established in the design of sewage purification works of this character, and it is my opinion that in the present case it is entirely too brief. It is true that there is a compensating relation that exists between settling capacity and fineness of mesh of screens, and that if the screens be very fine the settling capacity need not be so great, and vice versa. It is also true that by increasing the time of settlement a relatively greater amount of sludge, difficult and costly to dispose of, is produced, but it is important to remember that this additional sludge means additional purification, and that this is an essential and fundamentally important matter in the present case and cannot be overlooked by this Department, which is charged with the responsibility of conserving the purity of the waters of the State.

I am of the opinion, therefore, that notwithstanding the relatively fine mesh screens which it is proposed to adopt, the detention period in the settling

tanks should be increased. It should not be increased to such an extent as to place any considerable or unreasonable burden of expense in the cost of operation upon the city, and if the period was increased to twice that provided a much safer and conservative requirement would be imposed. This means that the tanks have to be of double the proposed capacity and also that the difficulty and cost of sludge disposal will be considerably greater. The increased cost in construction and maintenance due to these changes will not in my opinion be great, nor unwarranted, in view of the increased purification and security of freedom from objectionable results from the method of disposal.

In regard to the lack of provision for discharging the effluent at more than one point in the lake, I would suggest that this is likewise an important omission and one that should be supplied. The most objectionable condition to be feared from such a method of sewage disposal as here contemplated is that of possible local nuisance in the immediate neighborhood of the point of discharge. Such nuisances, when they occur, most generally result from an attempt to discharge too large a volume of sewage at one point, or to discharge it at a point too near shore, and the nuisance is usually directly proportional to the volume of sewage. Conversely it is possible to reduce and usually eliminate these local nuisances by extending the outlets or providing two or more distinct, and more or less widely separated, outlets, thus reducing the volume of sewage discharged at any one point.

Whereas, then, no nuisance may be created in the immediate neighborhood of the proposed outlet, with the changes in the disposal plant recommended below, during the early period immediately following the completion of these works, I am of the opinion that such local nuisances would be likely to occur at times with only a single outlet during later years as the volume of sewage increased. To provide against this future contingency the plans should be modified to the extent of inserting branches at or near the end of the proposed outfall sewer, or otherwise making provision which will permit the flow to be divided and be discharged at two or more outlets.

As a further security or protection against any nuisance or danger to health which may in the future be shown from experience to arise from the discharge of the effluent into Lake Ontario, provision should be made at the end of the outfall sewer for extending it further out into the lake.

The report of Mr. Kuichling shows that it is perfectly feasible, and in my opinion, within reasonable cost, to disinfect the sewage effluent from the proposed settling and screening works before its discharge into the lake and thereby destroy all pathogenic bacteria that may be carried to and might be shown to endanger the water supplies taken now, or in the future, from the lake. Disinfection of sewage though not in any way prohibitory as to expense, is, nevertheless, costly, as pointed out above, and if changes and modifications are made in accordance with the recommendations later given which will provide increased capacity and more efficient facilities for discharging the sewage into the lake, there appears to be no reasonable grounds for requiring this great expense at the present time. Should Rochester ever turn to Lake Ontario for a supplementary supply, or should other conditions arise, or should it be found from experience that public health is in any way affected by the discharge of this settled and screened sewage into the lake, the question of disinfection could then be considered and applied.

I wish to point out, finally, that if after the extensive changes and provisions are made or embodied in the plans in accordance with the recommendations given below and the works have been constructed and put in operation, it be found from experience that any question affecting the public health or a local nuisance in the vicinity of the intake or at more distant points arises due to the suspended matters in the sewage, or to putrescibility of the organic matter contained therein, the report of Mr. Kuichling further shows that it would be possible, even though relatively more expensive than disinfection, to further clarify the sewage by sedimentation, or to produce even a higher degree of purification by treatment in rapid filters, land for which might be available or easily secured in the vicinity of the proposed site for the disposal works.

To summarize briefly my opinions and conclusions concerning these plans, following a careful examination and study of them, I would state:

1. That the proposed system of intercepting and outfall sewers will remove from the Genesee river practically all of the sewage now discharged into this river by the city of Rochester at all times, except during heavy rainfalls when the sewage will be discharged through overflows in a highly diluted state.

2. That the diversion of this sewage will remove practically all offense and nuisance along the river in and below the city and along the shores of Lake Ontario near the outlet of the river.

3. That during heavy rainfalls when overflowing of sewage will occur, the dilution of the sewage will be so great as to prevent any appreciable nuisance in and along the river below the points of overflow.

4. That whereas the method of sewage disposal proposed, viz., by preliminary treatment in settling and screening tanks and final treatment by dilution, oxidation and digestion in Lake Ontario, is in principle a suitable and appropriate one for the city of Rochester, the plans are insufficient and inadequate as to capacity and important details and should be so modified and corrected as to provide:

   a. Settling tanks of twice the capacity shown by the plans.

   b. Skimming boards or other means for removing objectionable grease and oils.

   c. Branch connections near the end of the outfall sewer in the lake to permit the flow to be divided and discharged at two or more outlets in the lake, whenever such provision may become necessary.

   d. Suitable means at the end of the outfall sewer which will permit of its being extended further out into the lake if, or whenever, such provision may become necessary.

5. That the proposed method of preliminary treatment, if modifications in the plans are made in accordance with the above recommendations, will eliminate from the sewage all of the grosser, and a large percentage of the finer, suspended matters, which, on account of their relative insolubility and difficulty of segregation, and their offensive and dangerous nature, are easily transported by winds and induced surface currents, to considerable distances.

6. That if the changes above recommended are made in the plans, the finer suspended solids remaining in the partially clarified effluent, after passing through the settling and screening tanks and after their discharge into Lake Ontario 7,000 feet from shore in over fifty feet of water, will be subject to combined action of sedimentation, dilution and dispersion to such an extent that no traces of sewage will be discernible to the senses along the shores of the lake or at any considerable distance from the outlet.

7. That at times, under unfavorable conditions of wind and wave action, pollution from the effluent of the proposed settling and screening plant discharged into the lake 7,000 feet from shore will even with modifications in plans above recommended, be carried to the intakes of the water supplies of the Rochester and Ontario Water Company, and of the village of Charlotte. This pollution will, on the whole, be much less in amount than occurs under existing conditions with the sewage of Rochester discharged into the river, and in turn into the lake near these intakes, and it will occur in such small amounts, at such infrequent intervals and be so diluted and attenuated, that with properly installed water purification plants the health of the communities using those supplies will be amply protected against any danger of infection.

8. That the possibility of any traces of sewage from the proposed outfall ever reaching the intake of the Oswego water supply, some fifty miles distant, is too remote for practical consideration. Even if traces were ever carried to this intake under unfavorable conditions they would be in such minute amounts and so attenuated as to have no appreciable effect on the public health of the citizens of Oswego, and entirely negligible as

compared with the pollution of this water supply by the polluted waters of Oswego river which now enters the lake only a short distance from said intake.

9. That if it be found in the future, after these works have been put in operation and after practical opportunity has been afforded to observe and study the effects of the discharge of effluent from the proposed plant into the water of the lake, that the health or comfort of the people who reside along the shores of Lake Ontario, or who may use the water for drinking, bathing or other purposes, is in any way deleteriously affected, it will be easily possible, and within reasonable cost, to increase the degree of purification by providing increased or additional sedimentation, supplementary treatment in biological filters or the application of disinfectants, or all.

In view of the foregoing conclusions, and of the expressed policy of this Department of preventing the discharge of raw or insufficiently treated sewage into the waters of this State, I beg to recommend that these plans be disapproved in their present form, and that they be returned for corrections and modifications in accordance with the suggestions and recommendations outlined above.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *July* 26, 1910.

Mr. E. A. FISHER, *City Engineer, Rochester, N. Y.:*

DEAR SIR: — I am returning to you, by express, the plans of the intercepting sewer system and sewage disposal plant for the city of Rochester, submitted for my approval March 1, 1910.

Realizing the importance of the questions involved, and that the decision of the Department in this matter is one of vital interest to the city of Rochester, a careful study of the plans was made by our engineers. Desiring to get all possible information on the questions involved, I held a public hearing in the city of Rochester on June 9, 1910, where the matter of the plans was discussed and anyone who desired to do so might be heard in reference to them.

Believing that the city of Rochester should have the best advice on this matter that the Department could give it, I submitted the matter of the approval of these plans to three of the leading experts in sanitary engineering in this country, Messrs. Allen Hazen, New York city; X. H. Goodnough, of Boston, Mass., and F. Herbert Snow, of Harrisburg, Pa. A number of questions were submitted to each of these gentlemen and the matter was gone over with them carefully by our chief engineer.

The questions regarding which they were requested to express an opinion are as follows:

1. Will the system of intercepting sewers removing from the Genesee river the raw sewage of Rochester except during time of storm, eliminate practically all nuisance from the river in and below the city of Rochester?

2. Will the overflow of sewage during storms after proposed plans are executed, produce any nuisance along the river in or below the city?

3. Will the effluent from the proposed sedimentation and screening plant, after discharge into lake 7,000 feet from shore in fifty-five feet of water, produce any nuisance in the lake at the point of discharge or beyond a very limited zone immediately surrounding such point of outlet?

4. Will pollution affecting in any way the senses occur along the lake shore as a result of discharge of the effluent from the proposed sedimentation and screening plant, under adverse conditions of wind or wave action?

5. Will any chemical or biological traces of sewage ever be found so far distant from the outlet as along the shores of the lake?

6. Will the sewage effluent from the proposed sedimentation and screening plant, discharged at a point 7.000 feet from shore in fifty-five feet of

water result in less pollution along the shores of Lake Ontario, east or west of the mouth of the Genesee river, than now occurs from the raw sewage discharged into the Genesee river, and in turn into the lake at the mouth of the river?

7. Will any pollution from the discharge of effluent from proposed settling and screening plant reach the shores of Lake Ontario in amounts and under conditions that will injuriously affect bathing along these shores or appreciably menace the health of bathers?

8. Will the organic matter remaining in the sewage effluent after treatment in the proposed sedimentation and screening plant be ultimately completely oxidized before any such organic matter has traveled any considerable distance from the outlet, especially before it could travel as far distant as 7,000 feet, to the nearest shore of the lake?

9. Will the discharge of the effluent from the sedimentation and screening plant under the proposed conditions affect the potability of the filtered water supply of Rochester & Ontario Water Works, west of the mouth of the Genesee river and some three miles from this proposed outlet?

a. More deleteriously than under existing conditions of discharge of raw sewage into the Genesee river?

b. In general to such an extent, assuming ordinary operations of the filter plant, so as to be a menace to this supply?

10. Will any pollution derived from the discharge of the effluent of the proposed disposal works —

a. Ever reach the water intake of the Oswego supply, taken from the lake some fifty miles distant, just west of the mouth of the Oswego river?

b. If it should ever reach the intake under unfavorable conditions of wind, would the pollution be

1. Less in amount and frequency than would occur from pollution carried from the polluted Oswego river and the sewers of the city of Oswego?

2. In such amounts and with such frequency that, independent of other pollution, it would appreciably affect the potability of the Oswego supply?

11. If the proposed plans are insufficient, should additional purification be accomplished —

a. By removing danger to health by disinfection or sterilization?

b. By increased oxidation or nitrification through biological filtration?

c. By double protection obtained by biological filtration and disinfection?

12. In view of the fact that the Genesee river below Rochester will not be potable after the execution of the proposed plans, and cannot be made so because of the pollution which must directly or indirectly reach the river during its course, should only such purification be required as will guarantee freedom from any nuisance or any effect upon the senses?

13. Judged in the light of the broader problem of Great Lake pollution, and the establishing of a general policy concerning the requirement for sewage purification, in connection with not only the city of Rochester but of other cities and municipalities along the entire Great Lake system, are the proposed plans in their present form, or a somewhat modified form, sufficient and appropriate; and in your opinion should they be approved by the Department unconditionally, or upon certain conditions and what?

A copy of the written report of each one of the engineers is being transmitted to you, together with the copy of the report of the Chief Engineer of the Department.

After a careful consideration of the questions involved, I am unable to approve these plans in their present form, and they are, therefore, returned to you without my approval. The changes which will be required are fully outlined in the report and are, briefly, as follows:

1. Settling tanks of twice the capacity shown by the plans.

2. Skimming boards or other means for removing objectionable grease and oils.

3. Branch connections near the end of the outfall sewer in the lake to permit the effluent to be divided and discharged at two or more outlets, whenever such provision may become necessary.

4. Special means at the end of the outfall sewer which will permit of it being extended further out into the lake, if, or whenever, such a provision may become necessary.

In any event, the approval of these plans and permit granted in connection with them, will be conditional and will explicitly provide that if it be found after these works have been put in operation and after practical opportunity has been afforded to observe and study the effects of the discharge of effluent from the proposed plant into the waters of the lake, that the health or the comfort of the people who reside along the shores of Lake Ontario or who may use the water for drinking, bathing or other purposes, is in any way deleteriously affected, that there be such increase in the degree of purification by providing increased or additional sedimentation, supplemental treatment in biological filters, or other additional method of disposal as may be necessary to properly protect the public health and prevent a public nuisance.

As soon as the changes and modifications have been made in these plans in accordance with the recommendations contained in the report of our Chief Engineer, and they are returned to me for approval, they will again be promptly considered.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *September* 22, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of my examination of the revised plans for a system of intercepting sewers and sewage disposal works for the city of Rochester which were resubmitted for your approval August 20, 1910.

These plans were first submitted for approval by the city authorities on March 1, 1910, and after a careful examination of them by the Engineering Division a report was submitted to you under date of July 18, 1910, setting forth the results of this examination and making recommendations for certain changes and revisions before the final acceptance of them. In order to safeguard the interests of the citizens of Rochester in this matter a public hearing was held in Rochester on June 9, 1910, where an opportunity was given for full discussion of the plans. In order to secure a disinterested and scientific decision in regard to not only the essential features of the design but as to the general and important larger questions involving the sufficiency and appropriateness of the method of disposal proposed, the plans were, further, submitted individually to three eminent sanitary engineers of the country for their professional opinions.

These plans were accordingly returned by you to the city authorities on July 26, 1910, for modifications and additions in the following respects:

1. That the settling tanks be made of twice the capacity shown on the plans.

2. That skimming boards or other means of removing the objectionable grease or oils be provided.

3. That branch connections be made near the end of the outfall sewer in the lake to permit the sewage effluent to be divided and discharged at two or more outlets whenever such provision may become necessary.

4. That special means be provided at the end of the outfall sewer to permit of its being extended further into the lake if or whenever such extension may become necessary.

After a careful examination of the revised plans I find that they have in general been modified and corrected in accordance with all the above requirements. I find, however, that the provision for doubling the capacity of the settling tanks has been accomplished not by increasing the size of the settling or detritus tanks but by adding to these settling or detritus tanks six additional supplementary tanks having a total capacity of twice the capacity of the settling or detritus tanks shown on the original plans.

It is evident, then, that although the modifications recommended have been carried out in general conformity with the recommendations and that the required increased capacity has been secured by the new plans it has been accomplished in a somewhat different manner than was contemplated and recommended in my previous report to you. The manner of securing increased capacity of tanks proposed by the revised plans is, however, in my opinion an improvement over the original plans, since it gives an opportunity for a separation of the solids which will be retained in these tanks and will undoubtedly simplify the handling and disposition of sludge.

I note in the report of the consulting engineer that it is proposed to regularly operate the detritus tanks with only three of the supplementary sedimentation tanks which it is claimed by him will give the necessary increased capacity called for. This method of operation, however, is not in accordance with the recommendations made in regard to increasing the capacity of the settling or detritus tanks, since any general results obtained by passing sewage through two independent tanks of a given size is not the same as that obtained by passing the sewage through a single tank having a total capacity of the two independent tanks. In view, however, of the improved means of separation of sludge provided by the revised plans as well as the total surplus capacity also provided, I would recommend that four of these supplementary tanks instead of three as recommended by the consulting engineer be used with the settling or detritus tanks in the daily operation of this plant.

In view of the foregoing I beg to recommend, therefore, that the revised plans as now submitted be approved and a permit be issued to the city of Rochester for the discharge into Lake Ontario of the effluent from the proposed sewage disposal works which shall provide in addition to the usual modification and revocation clauses the following requirements or conditions:

1. That all portions of the sewage disposal works shall be fully constructed in complete conformity with the plans as approved or with such detailed plans as may hereafter be called for and approved by this Department; and the general methods of operating such works shall at all times conform to the requirements of the State Commissioner of Health.
2. That multiple outlets shall be constructed and the outfall sewer shall be extended when in the judgment of the State Commissioner of Health such construction and extension shall become necessary or desirable.
3. That no sludge shall be discharged into Lake Ontario.
4. That whenever required by the State Commissioner of Health complete detailed plans satisfactory to this Department for more complete treatment of the sewage of the city of Rochester shall be submitted to the Department for approval and any or all portions of the sewage disposal works shown by said plans shall be thereafter constructed and put in operation when required by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ROCKAWAY BEACH

On January 28, 1910, plans for sewerage and sewage disposal for Rockaway Beach were submitted for approval by Mr. A. J. Provost, Jr., civil engineer of New York city, on behalf of the Neponsit Realty Company. These plans were approved on March 16, 1910, and a permit was issued allowing the discharge,

into the Rockaway inlet, of effluent from the proposed sewage disposal plant on condition that no sewage sludge shall be discharged into Rockaway Inlet or other adjacent bays or channels; that whenever required by the State Commissioner of Health plans satisfactory to this Department for treating the effluent by sterilization or disinfection, or for other and more complete treatment of sewage shall be submitted for approval; that whenever required by the State Commissioner of Health the sewage disposal plant shall be so operated as to discharge effluent from the settling tank only during the first four hours of ebb tide; and that whenever deemed necessary or desirable additional tank capacity shall be provided in order to secure such discharge on ebb tide.

ALBANY, N. Y., *March* 9, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewerage and sewage disposal works for a proposed realty development at Rockaway Beach recently submitted to this Department for approval.

This undeveloped section of Rockaway Beach consisting of about 100 acres of land is located opposite Barren Island and is being laid out into streets and developed as a site for a summer colony by the Neponsit Realty Company. The ultimate population is estimated by the designing engineer at 5,000 persons which is a somewhat liberal allowance at this time for an area of this size, but may be reached in the future. The water is to be supplied by the Queens County Water Company of Far Rockaway and the daily consumption is estimated at sixty gallons per capita.

The plans show that it is proposed to construct sewers in all streets. The sewage is to be collected by means of 8 and 10-inch cast-iron and vitrified pipe sewers and conveyed by gravity to the pumping station to be located near the bay at the intersection of Delta street and Newport avenue, from which it is to be discharged into the proposed settling tank through a 10-inch force main. Flush tanks are to be installed at the ends of all lateral sewers.

It is said that special efforts will be made to exclude ground water from the system as far as possible inasmuch as cast-iron pipes with lead joints are to be used below elevation -2.5 (datum being mean high tide).

The plans have been carefully examined by the Engineering Division in regard to grades, sizes, velocities, capacities and other hydraulic and sanitary features concerning the proposed sewers, and they are found to be sufficient to meet the future requirements of this district upon the basis of population used, and assuming that in the construction the sewers will be made sufficiently watertight to prevent excess leakage.

According to the plans the sewage disposal plant is to consist of a settling tank divided into three compartments and so arranged that one, two or all three of the compartments can be operated at a time. The total capacity of the tank is sufficient to give about nine hours' detention of sewage on the basis of 5,000 persons and an average rate of water consumption of 100 gallons per capita per day. It would appear, therefore, that for the proposed method of treatment the settling tank is suitable and adequate for reasonable service in the future and of sufficient capacity to care for a considerable quantity of ground water infiltration that may unavoidably find access to the sewer system. The effluent is to be discharged continuously into Jamaica Bay through a 12-inch pipe.

Each compartment of the settling tank is provided with a sump to facilitate the accumulation and discharge of sludge and toward which the bottom of the compartment slopes. A 10-inch cast-iron pipe is to convey the sludge by gravity from the sump to the sludge pump well provided with a centrifugal pump having an 8-inch suction. It is proposed to pump the sludge into a scow which is to be towed to sea and dumped whenever it shall become necessary to clean the tank.

The sewage disposal plant is designed so as to give flexibility of operation and, if properly constructed and operated, should produce an effluent that will not create a local nuisance inasmuch as a large percentage of the solids

in suspension will be retained in the settling tank and the volume of water into which it is proposed to locate the discharge pipe and the flow of the tides should give an adequate dilution and rapid dispersion.

As respecting the manner of discharging effluent from the plant, it would seem desirable, as in the case of certain other disposal plants on tidal waters, to arrange either for the present or for the future to discharge such effluent during ebb tide.

The arrangement of the proposed settling tank with its division into three compartments lends itself very readily to such a method of discharging effluent and with very little change in the plans as submitted, provision may be made for discharging effluent during the first four or five hours of ebb tide, first by using one chamber as a storage tank and later, when the sewage flow has increased beyond a certain limit, by using two of the chambers as storage tanks. Then, finally, when such method of operation would result in too short a time of detention in the remaining compartment in use as a settling tank, an additional storage tank might be constructed if deemed necessary.

With respect to the extent of purification of sewage which should be required at this point and considering the question with reference to the possible pollution of the waters over shellfish grounds leased in Jamaica Bay, it would seem from the results of the investigation of the pollution of such waters carried on by this Department in 1908 that the effect of the discharge of effluent from the proposed plant as affecting the sanitary quality of the waters would be inconsiderable as compared to the effect of the direct discharge of sewage into Beach Channel and Jamaica Bay that now occurs during the summer season along the entire Rockaway Beach district to the east of the proposed disposal plant site.

In view of the above and since a vastly greater discharge of sewage into Jamaica Bay occurs at several points other than along Rockaway Beach and where the possibility that such discharge will injuriously affect shellfish grounds is much greater than in the case of the discharge of effluent from the proposed plant, I believe that a permit to discharge effluent from the proposed plant may reasonably be granted, provided a proper provision is made for discharge during ebb tide and for more complete treatment or sterilization of the effluent if this is later deemed necessary or desirable.

I would, therefore, recommend that the plans be approved and a permit for the discharge into Rockaway Inlet of effluent from the proposed settling tank be granted which shall embody, in addition to the usual modification and revocation clauses, the provision that whenever deemed necessary by the State Commissioner of Health, and upon due notice, plans satisfactory to this Department for sterilization of the effluent from the settling tank or for more complete treatment of sewage shall be submitted to this Department for approval and that such works for the sterilization of the effluent or for more complete treatment of sewage shall be constructed and put in operation within the time limit then specified.

I would further recommend that the permit require that whenever deemed necessary or desirable by the State Commissioner of Health, the disposal plant shall thereafter be so operated as to discharge effluent from the settling tank during the first four hours of ebb tide, only; and that when the amount of sewage received by the plant shall, by reason of such manner of regulating the discharge of effluent, necessitate the construction of an additional storage tank in order that proper settlement of sewage may occur before discharge, that such additional storage tank shall be constructed.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ROME

On November 3, 1910, application was received from the Board of Water and Sewer Commissioners for the approval of plans for proposed sewer extensions in Fourth, Park and other streets in the City of Rome, plans having been submitted on October 24, 1910.

These plans were approved on December 2, 1910, and a permit was issued allowing the discharge, into Wood Creek, of sewage to be collected by the proposed sewers. This permit contains in addition to the usual revocation and modification clauses the following conditions:

1. That on or before February 1, 1911, detailed plans for settling, sedimentation or septic tanks to treat the sanitary sewage of the city of Rome, which shall meet the requirements of this Department, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage, shall be submitted to this Department for approval.
2. That the said settling, sedimentation or septic tanks shall be constructed and put in operation by September 1, 1911.
3. That whenever required by the State Commissioner of Health detailed plans for said additional works for more complete treatment of the sewage of the city shall be submitted for approval and that any or all portions of said additional or supplementary works for more complete treatment of the sewage shall be constructed and put into operation when required by the State Commissioner of Health.

ALBANY, N. Y., *November* 23, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sanitary sewer extensions in the city of Rome, Oneida county, submitted to this Department for approval by the superintendent of the city water works in behalf of the Board of Water and Sewer Commissioners, on October 24, 1910.

The plans show profiles of proposed sewer extensions to be constructed as follows:

1. About 230 feet of 8-inch sewers on a grade of 2.5 per cent. in Fourth street to discharge into the existing manhole in Dominick street. The plans show no manhole at the upper end of this sewer.
2. About 300 feet of 6-inch sewers on a grade of 0.8 per cent. in Park street of which 219 feet are already constructed. This sewer is tributary to the existing sewer in Jay street and is to be provided with a flush tank at the upper end.
3. About 250 feet of 8-inch sewers on a grade of .3 per cent. in Linden street to discharge into the existing manhole at its intersection with George street. There is no manhole shown at the upper end of this sewer.
4. About 250 feet of 8-inch sewers on a grade of 0.8 per cent. in Elm street and Ashland avenue. One hundred and twenty-eight feet of this sewer has already been constructed and is tributary to the existing sewer in Croton street. No manhole is shown at the upper end. Ashland avenue is not shown on the general plan on file in this office.
5. About 100 feet of 6-inch sewers on a grade of 2.0 per cent. in Dean street tributary to the existing sewer in "Alley." Dean street is not shown on general plan.
6. About 450 feet of 6-inch sewers on a grade of 1.5 per cent. tributary to the existing sewer in Dominick street. This sewer is to be provided with an intermediate lamp hole and a flush tank at the upper end.

The proposed sewer extensions if properly constructed should be adequate as to size and capacity to meet the future requirements for sanitary sewerage for the district to be served by them on the usual assumptions as to population

and sewage contribution. The gradient of the proposed sewer in Linden street, however, is too flat to insure self-cleansing velocities with a low flow of sewage and should be increased to about .4 per cent. in order to decrease the cost of maintenance.

As noted above not all of the streets in which it is proposed to construct sewers are shown on the general sewer plan of 1904 of the city or, if shown, are not marked on this plan. The plans now before the Department and under consideration, however, can be passed upon inasmuch as the proposed extensions are all tributary to the existing sewer system. In order, however, to facilitate the examination of plans that may be submitted for approval in the future, the sewer commissioners should be requested to submit a copy of a general sewer plan showing all sewers and streets constructed to date.

The question of sewage disposal for the city of Rome has been before the city authorities for some time in the form of injunction suits now pending in the local courts. A preliminary report on the sewage disposal problem of the city containing estimates of costs of several different methods of sewage disposal including settling or septic tank treatment followed by sand filtration, broad irrigation and sprinkling filter was prepared by Knight and Hopkins, Civil Engineers, and submitted to the Board of Water and Sewer Commissioners. A copy of this report was left with this Department for consideration at a conference in this office with Mayor Kissenger, city attorney and some other gentlemen on June 22, 1910.

At the time of my conference with the city officials and inspection of the proposed sewage disposal sites on November 21, 1910, I was informed by them that it was the intention of the city to present final plans for sewage disposal at the earliest possible time. It has not been definitely decided, however, as to which of the proposed methods of sewage disposal reported upon by Messrs. Knight and Hopkins will be adopted although it appeared to be a feeling in the city that the method of purification by settling tanks followed by sprinkling filters would be the more satisfactory.

There appears to be urgent need for sewage disposal especially in view of the gross pollution of Wood Creek which now receives from ninety to ninety-five per cent. of the sewage of the city and while it may be difficult for the city to construct complete purification works at this time owing to the fact that its debt limit has nearly been reached, steps should, however, be taken to provide for at least settling or septic tank treatment at an early date.

I would recommend therefore that the city be required to submit detailed plans for settling, sedimentation or septic tank treatment and general plans for supplementary treatment as soon as possible.

I would further beg to recommend that the plans be approved and a permit issued allowing the discharge into Wood Creek of sewage to be collected by the proposed sewers and that the permit contain in addition to the usual modification and revocation clauses, the following conditions:

1. That on or before February 1, 1911, detailed plans for settling, sedimentation or septic tanks to treat the sanitary sewage of the city of Rome, which shall meet the requirements of this Department, accompanied by general plans for additional or supplementary works for more complete treatment of sewage, shall be submitted to this Department for approval.

2. That the said settling, sedimentation or septic tanks shall be constructed and put into operation by September 1, 1911.

3. That whenever required by the State Commissioner of Health detailed plans for said additional works for more complete treatment of the sewage of the city shall be submitted for approval and that any or all portions of said additional or supplementary works for more complete treatment of the sewage shall be constructed and put into operation when required by the State Commissioner of Health.

Very respectfully,

THEODORE HORTON,

Chief Engineer

SONYEA (Craig Colony for Epileptics)

On July 26, 1910, plans for proposed alterations and additions to the existing sewage disposal plant at the Craig Colony for Epileptics, Sonyea, N. Y., were submitted for approval by the State Architect. These plans were approved on August 16, 1910.

ALBANY, N. Y., *August* 15, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for alteration and additions to the existing sewage disposal plant at Craig Colony for Epileptics, Sonyea, N. Y., submitted to this Department for approval on July 26, 1910.

According to the report of the State Architect the present population of the institution is about 1,500 and the daily water consumption is estimated at 100 gallons per capita. It appears that there will probably be no material increase in the population in the future inasmuch as similar institutions for this class of patients are being erected in other parts of the State. The existing sewage disposal plant consists of a screen chamber, dosing tank and three natural underdrained sand and gravel filter beds having a combined area of about three acres. It appears that the existing dosing tank and filter beds are inadequate as to size and capacity to properly care for the sewage from the institution under the present method of operation.

The plans now under consideration show that it is proposed to install a new settling tank and dosing chamber, and to regrade the three existing filter beds and subdivide them into 12 beds of .25 acres each. Two of these beds are to be used as sludge beds and for treating sewage while siphons are being cleaned.

The proposed alterations and additions to the sewage disposal plant are in general accordance with the recommendations of Professor Ogden for increasing the capacity of the disposal works.

The settling tank is divided into two compartments, one of which is to be constructed with four hoppers constituting the bottom of this compartment for the collection and depositing of sludge. These hoppers are provided with blow-off pipes and valves for discharging the sludge to the sludge beds without emptying or drawing off the liquid in the tank.

The screened sewage enters the settling tank through submerged inlets and flows over a weir into the second compartment from which it is discharged through a submerged effluent pipe collector into the dosing chamber. The capacity of the settling tank is sufficient to give five hours' detention of sewage for the sewage contributed by the present population, and this time of detention is increased to about six hours by the use of the old dosing tank located near the screen chamber which is to be reconstructed.

The dosing chamber is to be provided with three 8" alternating siphons and so arranged as to draw off about 3" of sewage from the first compartment of the settling tank and 9" from the other compartment at each dose and discharge into central manholes located in the center of the reconstructed filter bed areas. These manholes are each provided with 4 shear gates so that one dose from the dosing chamber can be discharged into the distributing system of any one of the 4 smaller beds into which each of the old filter bed areas is subdivided. One dose is sufficient to cover each unit of the filter to a depth of about .1 of a foot.

The filter beds are to be formed by building up new embankments so as to form 4 units of .25 acres each from each one of the 3 old filter beds, making 12 in all. The existing system of underdrains is to be left intact and it was learned from the designing engineer that these drains are laid about 3.5 feet below the surface of the filters. The old filters were constructed by grading the natural soil, composed largely of sand and gravel, and by laying underdrains.

At the present rate of sewage contribution the filter beds will be required to treat settling tank effluent at the rate of about 60,000 gallons per acre per day. The effluent from the filters is to discharge through the present outlet into Kushsana creek, a tributary of the Genesee river.

If properly constructed and operated the reconstructed sewage disposal works should produce a satisfactory effluent, and I, therefore, recommend that the plans be approved.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

SPRING VALLEY (Salvation Army Orphanage)

On April 22, 1910, plans for sewage disposal for the Salvation Army Orphanage (Cherry Free Home) near Spring Valley, in the town of Ramapo, were submitted for approval. Alternate plans were submitted on May 3, 1910, and on May 23d the designing engineers were advised that the approval of either of the two alternate methods of disposal would be considered favorably as soon as such plans were submitted in proper form.

On June 2, 1910, plans for the second or alternation plan of pumping sewage direct to the distributing system of the disposal field were submitted for approval. These plans were approved on June 8, 1910, but no permit was issued since, as the plans do not provide for the discharge of sewage or sewage effluent into any of the waters of this State.

ALBANY, N. Y., *June* 8, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for a proposed sewage disposal plant at the Salvation Army's Orphanage, near Spring Valley, Rockland county, submitted to this Department for approval on April 22, 1910.

Plans for sewage disposal for this institution were prepared by the Ashley House Sewage Disposal Company and submitted to this Department for approval early in June, 1909, but were returned for certain corrections and modifications with reference to the septic tank and nitrification beds on June 21, 1909. Subsequent to this date an inspection was made by one of our assistant engineers, in accordance with your direction, of the method of sewage disposal at the orphanage, inasmuch as a complaint had been received by the Department of the pollution of a tributary of the Saddle and Passaic rivers by the discharge of wastes from this institution. The result of this inspection was submitted to you in a report dated December 30, 1909, to which reference is made for a detailed account of the location, population, water supply and present method of sewage disposal of the Salvation Army Orphanage.

On April 22, 1910, the following plans were submitted in duplicate, together with duplicate report of the designing engineers:

1. General plan of the sewage disposal system.
2. Plan and section of dosing tank and discharge siphon.
3. Plan and section of receiving well, showing screens and pumping system.

According to the report of the designing engineers the present and normal population of the institution consists of 60 children and 25 adults, giving a total of 85 persons, and it is stated that the maximum cannot at any time exceed 100, with an estimated water consumption of 3,500 gallons per day. At the time of the inspection above referred to, however, the population was 100, consisting of 75 children and 25 adults, and it was learned from the official in charge that the capacity of the institution may at some future time be increased so as to care for a total population of 150 persons, including officials and attendants.

The plans show that it is proposed to dispose of the sewage from the institution by means of screening and "broad irrigation." The existing cesspool which is about 14 feet in diameter will be utilized as a receiving well from which the sewage will be pumped either to a dosing chamber located above the disposal field, about 400 feet from the well or reservoir, or pumped direct to the outlets at the disposal field.

The cesspool will be reconstructed so that the sewage will pass through two screens before reaching the suction of the pump. The first screen is to consist of ⅝"x⅝" bars, spaced ⅝" apart in the clear, and arranged so that the screenings may be raked upon a platform placed at about the same elevation as the top of the screen. The second screen is to be made of heavy galvanized wire and to be placed in a vertical position back of the bar screen and arranged so as to be removable for cleaning.

The screened sewage will be pumped to the dosing chamber through a 2½" force main by means of a 2" submerged centrifugal pump to be driven by a 3-horsepower vertical electric motor. The motor is to be controlled by an automatic starting and stopping device connected with a float and adjusted so that about 2,500 gallons will be pumped at one operation. The pump is to have a capacity of from 60 to 70 gallons per minute and, if properly installed and operated, should be adequate to satisfactorily handle the sanitary sewage contributed by the institution.

It was proposed to deliver the sewage from the pump to the disposal field in one of two ways. In the first arrangement the force main from the pump is connected with a dosing chamber located about 45 feet above and at a distance of some 400 feet from the cesspool or pump well. This dosing chamber has a capacity of about 2,000 gallons and is connected with a siphon chamber provided with a 5" siphon. The chamber has three 5" outlets, each provided with a shear gate valve, and connected with 5" cast-iron distributing pipes placed at right angles to the main distributors. The three distributing pipes are each provided with 14–5"x2" branches for outlets, spaced 11' apart on centers. In front of each outlet is to be placed a concrete apron for the purpose of facilitating the distribution of the sewage over the surface of the ground.

The alternate plan, submitted to the Department on May 3, 1910, proposes to omit the use of the dosing chamber and provides for pumping the sewage direct from the cesspool to the outlets of the disposal field. The location and the general arrangement of the distributing pipes is practically the same as that shown on the first plan except that the outlets are to be vertical instead of horizontal. These outlet pipes, spaced 11' apart on centers are to be 2" in diameter, terminating about 6" above the level of the ground and made adjustable as to elevation above the top of the pipe so that each can be made to discharge the proper proportion of the quantity pumped. A concrete splash plate, 12" in diameter, is to be placed on the ground, each outlet pipe to break the fall of the sewage and protect the ground.

As in the first arrangement about 2,500 gallons of sewage is to be pumped at each running of the pump and this quantity will be discharged to the disposal field in some 30 minutes.

It is understood that the surface of the ground which is sloping will be graded and a growth of grass maintained upon it.

It is stated in the report by the designing engineers that the ground to be used for disposal is composed of a permeable and dry loamy soil, and assuming that the sewage will flow down the slope for a distance of 100 feet before it is completely absorbed by the soil the area over which the sewage will be distributed by either method is equal to about one acre. The disposal area will, therefore, be required to care for sewage at the rate of 10,000 gallons per acre per day, assuming that a population of 100 persons will contribute sewage at the rate of 100 gallons per capita per day. The actual contribution of sewage will probably not exceed one-half this amount, but owing to the greater strength it will perhaps be as difficult to dispose of as a more dilute sewage from the same population.

Owing to the probability of this ground becoming frozen during the winter and thereby preventing the sewage from percolating through the soil freely

it may be found necessary to prepare the disposal fields for cold weather, possibly by furrowing and ridging, or some other method so as to facilitate the absorption of the liquid by the ground and at the same time prevent the sewage from freezing.

With this provision it appeared that either one of the two proposed methods of caring for the sewage should be adequate and satisfactory if the disposal plant is properly constructed and operated.

The designing engineers were, therefore, advised by you, in a letter dated May 23, 1910, that while it would be impossible to pass upon these plans until complete duplicate plans for one or the other of these alternate methods of disposal were submitted for approval, you would consider favorably the approval of plans for either of the two methods as soon as such plans were submitted in proper form.

Accordingly, duplicate plans for the second or alternation plan of pumping the sewage direct to the distributing system of the disposal field were submitted to the Department for approval on June 2, 1910, and after a careful review of these plans, I beg to recommend that they be approved.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

STAMFORD

On April 8, 1910, certified copies of resolutions were received from the board of health and board of trustees of the village of Stamford in reference to the extension of a sanitary sewer in River street. The certification was approved on April 16, 1910.

ALBANY, N. Y., *April* 16, 1910.

BOARD OF TRUSTEES, *Stamford, N. Y.*:

GENTLEMEN:— In response to the application made to me by your board in accordance with a resolution adopted on April 6, 1910, as provided for by section 21 of the Public Health Law, asking for my approval of the certified recommendation of the board of health to your board to construct 2,700 feet of sanitary sewer extension in River street, plans for which were approved by this Department on June 17, 1892, as a part of the sewer system of the village of Stamford, I hereby approve the recommendation to construct the proposed sewer in River street.

The above approval is duly given this 16th day of April, 1910, in accordance with section 21, chapter 45 of the Consolidated Laws (Public Health Law).

ALEC H. SEYMOUR,

Acting Commissioner of Health

TICONDEROGA

On June 25, 1909, an inspection of the sewerage conditions of the village of Ticonderoga was made by the engineering division, and as a result of this inspection it was recommended that sewer extensions in the village should be carried along permanent and comprehensive lines. A copy of the report on the inspection is printed in the Thirtieth Annual Report (1909), page 213, to which reference is made.

On July 2, 1910, application was made by the board of trustees of the village for permission to discharge sewage into Ticonderoga creek from a proposed sewer in West Exchange street and vicinity.

A permit was issued on August 1, 1910, which contains the provision that

on or before February 1, 1911, complete plans, satisfactory to the Department, for a sanitary sewer system for the village of Ticonderoga, together with general plans for a sewage disposal plant to treat the entire sanitary sewage of the village, shall be submitted to this Department for approval.

ALBANY, N. Y., *August* 1, 1910.

Mr. T. E. HARVEY, *Village President, Ticonderoga, N. Y.:*

DEAR SIR: — I am enclosing a permit granted to the board of trustees of the village of Ticonderoga which allows the discharge into Ticonderoga creek of sewage to be collected by a proposed sanitary sewer from a point near Prospect street, thence across Prospect street and private property to West Exchange street and thence to Ticonderoga creek.

You will note that this permit to become operative must first be recorded in the county clerk's office of Essex county.

At the time of my communication to you of July 6, 1909, it was expected that before this time complete plans for sewerage for Ticonderoga would be submitted to this Department for approval, and upon the approval of such plans it was expected that application would be made for permission to defer the construction of portions of the system, as provided for by the Village Law, and to construct certain necessary portions of the system, notably the sewer from Prospect street to West Exchange street.

Such general plans have not as yet been submitted in shape for approval, and it is only on account of the urgent need for an improvement in sanitary conditions near West Exchange street that I am granting a permit for the discharge of sewage into Ticonderoga creek from the proposed sewer in advance of the submission of such plans.

However, you will note that the permit requires that such complete plans for sewerage, together with general plans for sewage disposal, shall be submitted for approval on or before February 1, 1911, and I trust that the plans will be submitted as soon as possible. In this manner opportunity will be afforded to construct other necessary portions of the village sewer system in accordance with the Village Law relating to sewer construction and the general insanitary conditions now existing at various points in the village may be remedied.

Very respectfully,

WM. A. HOWE, M.D.,

Acting Commissioner of Health

TUCKAHOE

See Bronxville and Tuckahoe, on page 388.

UTICA

On April 9, 1910, plans for a proposed sewer extension in Leeds street were submitted for approval by the board of contract and supply of the city of Utica. These plans were approved on April 13, 1910, and a permit was issued allowing the discharge of sewage from the proposed sewer into a tributary of the Mohawk river. This permit contains in addition to the usual revocation and modification clauses the following conditions:

1. That on or before May 1, 1911, the authorities having by law charge of sewer construction in the city of Utica shall submit to this Department for approval satisfactory plans as follows:

   a. Plans for intercepting or outfall sewers to convey the entire sanitary sewage of the city to a suitable site for disposal.

b. Detailed plans providing for a partial treatment of the entire sanitary sewage of the city by sedimentation and screening.

c. Plans showing the location, general arrangement and type of works for complete treatment of the sewage.

2. That whenever required by the State Commissioner of Health the intercepting or outfall sewer and the works for partial treatment of sewage shall be constructed within a time limit then specified.

3. That whenever required by the State Commissioner of Health, satisfactory, detailed plans for complete treatment of sewage shall be submitted to this Department for approval; and such works shall be constructed and completed within such time thereafter as may be specified by the State Commissioner of Health.

ALBANY, N. Y., *April* 13, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to sumbit the following report on the examination of plans for a proposed combined sewer extension in Leeds street in the city of Utica, Oneida county, submitted to this Department for approval on April 9, 1910, by the commissioner of public works.

Prior to the submission of plans now under consideration, no plans for sewer system or sewer extensions have ever been approved by the Department. The sewer system of the city is constructed on the combined sewer plan, there being eight separate outfalls into the Mohawk river. A trunk sewer was constructed in recent years along the river front from Division street to a point opposite Kossuth street. This trunk sewer intercepted some six separate outfall sewers and its construction was made necessary by reason of the abandonment of a portion of the old river channel north of the city.

The proposed 12-inch sewer extension in Leeds street is to extend from the intersection of Leeds and Eagle streets to the existing 15-inch sewer in Leeds street, a distance of some 480 feet. This sewer extension lies within the present combined sewer district and is to discharge into an arm of the Mohawk river at the foot of Jefferson street extended and north of the New York Central and Hudson River railroad tracks. The plans of the proposed sewer have been examined by the engineering division and found to be adequate to care for the sanitary sewage in that portion of Leeds street in which this sewer is to be constructed.

It seems advisable at this time that the attention of the city authorities should be called to the need of arranging for future treatment of the sanitary sewage of the city before its discharge into the Mohawk river and that some requirement should be made in this respect.

Not only the present condition of pollution of the Mohawk river but the inevitable increase in such pollution that will occur in the future, coupled with the facts that the city of Utica is located near the headwaters of the river and that the river is now being canalized, demand that arrangements be made for at least a partial treatment of the sanitary sewage of the city in the near future.

I, therefore, recommend that the plans be approved and that, under the provisions of section 77 of the Public Health Law, a permit be issued allowing the discharge into the Mohawk river of sewage to be collected by the proposed sewer, such permit to contain in addition to the usual revocation and modification clauses the provision that within, say, one year, plans for an intercepting sewer and for works for partial treatment of sewage by screening and sedimentation shall be submitted to this Department for approval, together with plans showing the general location, arrangement and type of works for the complete treatment of sewage.

I would further recommend that the permit contain provisions requiring that detail plans of works for complete treatment of sewage be submitted for approval by the city authorities on proper notification by the State Com-

missioner of Health and that any or all works for both the partial and complete treatment of sewage shall be constructed whenever required by the State Commissioner of Health.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

WATERTOWN

During the past year, plans for sewer extension in the streets listed below have been approved and permits containing the usual revocation and modification clauses have been issued in connection with such plans:

Date of approval	Description or location of sewers	Stream receiving sewage
February 11, 1910.	Emmett, Boon and Sand streets	Black river
March 15, 1910.	Sherman street	Black river
March 28, 1910.	Coffeen street	Black river
June 15, 1910.	Arsenal street	Black river
June 16, 1910.	Morrison street	Cowen's creek

WESTFIELD

Under date of January 14, 1910, application was made by the board of trustees of the village of Westfield asking for the approval of plans for a proposed sewer system and sewage disposal plant. Although the plans showed careful study and design, the sewage disposal plant as a whole was not well balanced, inasmuch as the capacity of the contact filters was somewhat small and the sludge bed was not well arranged. The plans were, therefore, returned for amendment on January 25, 1910.

The plans were revised and resubmitted for approval on February 17, 1910. They were approved on February 10, 1910, and a permit issued allowing the discharge into Chautauqua creek of effluent from the sewage disposal plant to be constructed in connection with the proposed sewer system.

On June 20, 1910, application was made by the board of trustees of the village asking for the approval of a proposition to construct the sewage disposal plant and certain portions of the permanent general sewer system. The proposition was approved on June 20, 1910, as noted below.

ALBANY, N. Y., *January* 15, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed sewer system and sewage disposal plant for the village of Westfield, Chautauqua county, submitted to this Department for approval on December 27, 1909.

The plans and documents consist of single copies of report and specifications by the designing engineer, together with tracings and prints of the following:

1. General topographical map of the village showing location of proposed sewers and sewage disposal plant.
2. Eight sheets of profiles of sewers and streets.
3. General layout and wall sections of disposal plant.
4. Details of septic tank.
5. Location plan of disposal plant.
6. Details of distributing and valve chambers.
7. Duplicate prints of manhole sections.
8. Section of automatic flush tank.

The village of Westfield is located in the northern part of Chautauqua county and about one mile from Lake Erie. The village has had a slow but steady growth during the past twenty years, amounting to about 2.5 per cent. a year. In 1890 it had a population of 1,983; in 1900, 2,430, and the present population is estimated at 3,144.

The proposed sewer system is comprehensive and adequate as to sizes, grades and capacities to meet any probable demand that may be made upon it for a considerable period in the future, provided that the sewers are properly constructed and no cellar drainage or storm water from roofs, streets or other areas is admitted to the system. The slopes of all sewers are sufficiently steep to produce self-cleansing velocities when flowing full or half full, and the upper or so-called "dead ends" of all sewers are provided with automatic flush tanks for the purpose of keeping these sewers clean. The plans show that it is proposed to collect and carry the entire sewage of the village to a point of disposal near the northwestern corner of the corporation on the east bank of Chautauqua creek, which flows in a northerly direction through the western portion of the village.

The sewage disposal plant consists of septic tank and contact beds. The septic tank is divided into two compartments which have a combined capacity of about 125,000 gallons. The sewage, upon reaching the disposal plant can be either by-passed or discharged into either one or both of the grit chambers. From the grit chamber it flows into the septic tank through submerged inlets after passing through coarse screens placed directly in front of the openings. The outlets from the septic tank are also submerged, inasmuch as they are connected with a slotted, submerged collector box across the end of the tank by means of riser pipes.

The septic tank has a capacity sufficient to give about ten hours' detention of sewage that would be contributed by the present population of 3,144 persons at a rate of 100 gallons per capita per day, and about six hours' detention for a population of 5,000 persons on the above assumption. At the present rate of growth this population should obtain in about twenty years.

The plans show that it is proposed to carry the sludge pipes from sumps in the septic tank to a point near the water line of Chautauqua creek, but no area is provided for the disposal of sludge and no sludge beds are shown. This omission should not be allowed, since the discharge of sludge directly into a stream as small as Chautauqua creek could probably not be done without creating a local nuisance. The additional cost of preparing beds for the proper disposal of sludge would be comparatively slight and in my opinion it would avoid the probability, or at least the possibility, of creating a nuisance.

From the septic tank the sewage is conveyed to a distributing chamber through a 12-inch vitrified pipe located in the division wall between contact beds Nos. 1 and 4. This distributing chamber at the center of the contact bed area is provided with the air-lock system for controlling the flow into the contact beds, the time of contact and the time of emptying the beds.

The contact beds are four in number, of equal capacity and have a combined area of about 0.4 acres with a 4-foot depth of broken stone. The beds are provided with distributors and underdrains.

Although the details of the sewage disposal plant show careful study and design, the plant as a whole is not well balanced. As noted above, the septic tank is adequate as to capacity for present needs and for reasonable service in the future. The contact beds, however, do not have a sufficient capacity to properly treat the septic tank effluent for the present population, assuming a per capita rate of contribution of 100 gallons per day. In practice it is found that contact beds of this depth have a capacity of not more than 400,000 gallons per acre per day when the sewage is of a strength equal to that furnished by a per capita rate of water consumption of 100 gallons per day and when the plant is under careful maintenance and operation. While no definite data is submitted as to the water consumption of the village, the design seems to be based on a contribution of sewage varying from 50 to 100 gallons per capita per day, and the report mentions an assumed flow of 50 gallons per capita for a future population of 5,000 persons. As stated, how-

ever, 100 gallons per capita is the basis which should be used, since the capacity of contact beds depends not only upon the volume of sewage to be treated but also upon the strength of the sewage.

In order, therefore, to more properly balance the sewage disposal plant and to make it more efficient for present and future needs, the depth of the contact beds should either be increased to six feet, retaining the present area, or, better, to make the depth five feet and increase the area some 20 per cent.

In conclusion, I would say that, while the sewer system and sewage disposal works have, in general, been carefully designed, the capacity of the contact beds should be increased and sludge beds should be added in order to make the plant thoroughly adequate, efficient and economical. I would, therefore, beg to recommend that the plans be returned for amendment in accordance with the above suggestions.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *February* 10, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report that revised plans for sewerage and sewage disposal for the village of Westfield, Chautauqua county, were resubmitted to the Department for approval on February 7, 1910.

The plans have been revised in substantial accordance with the recommendations embodied in the report of January 15, 1910, insofar as the total area of the contact beds is concerned and show that, although the four feet depth of the beds is to be retained, the area of the beds has been increased by some fifty per cent. The contact beds are now of ample capacity, if properly constructed and operated, to satisfactorily treat effluent from the septic tank resulting from the sewage which would be contributed by the present total population.

In regard to the disposal of sludge, the plans as revised, although providing for a sludge bed, are not satisfactory. It was stated in the report above referred to that a sludge bed should be provided for by the plans, "since the discharge of sludge directly into a stream as small as Chautauqua Creek could probably not be done without creating a local nuisance." The revised plans, however, do not provide for a sludge bed of sufficient capacity to prevent a direct discharge of sludge into the stream owing to the relative capacity of the septic tank and sludge bed and the unsuitable location of the bed with reference to the elevation of the bottom of the septic tank which is only 1.8 feet above the bottom of the sludge bed. Further, the location of the sludge bed and the limitations arising from probable ground water level and the elevation of water in the stream do not allow a sufficient grade for the sludge outlet pipe. Since the sludge from a greater portion of the bottom of the tank must be discharged by gravity flow, the grade of the outlet pipe should be preferably 1.0 per cent. in order that the pipe may be properly flushed after the tank has been drained.

The area or capacity of the sludge bed should, therefore, be increased and in this connection it might be suggested that in order to have a smaller quantity of tankage to provide for, contact beds No. 1 and No. 4 could be connected with each compartment of the septic tank by means of pipes and valves located some three feet below the flow line of the tanks, so that the sewage level in the tanks might be drawn down somewhat preparatory to discharging onto the sludge beds.

Owing to the peculiar topography of the proposed location, it may be necessary to place the sludge bed at some point down-stream from the site of the disposal works in order to arrange for adequate gradient for the outlet pipe, to provide a depth of at least one foot of sand over the underdrains, should

such underdrains be found necessary, and to provide sufficient capacity to care for the volume of effluent and sludge drained from the tank during cleaning.

According to the plans, it is proposed to provide for an emergency by-pass for the septic tank. Since no untreated sewage should be discharged into the stream, if a by-pass is deemed necessary it should discharge onto one of the contact beds, since temporary discharge of sewage onto the contact beds would not seriously interfere with their operation and such provision would prevent any discharge of raw sewage into the stream. It would seem, however, that a by-pass were unnecessary, since both the grit chamber and the septic tank are divided into two compartments each of which may be operated separately.

I would conclude that in order to make the design of the sewage disposal plant complete and thoroughly efficient and in conformity with the requirements of this Department, sludge beds should be provided to adequately dispose of the sludge and arrangements should be made to obviate entirely the discharge into the stream of untreated sewage or sewage sludge.

I beg, therefore, to recommend that the plans be approved and a permit be issued allowing the discharge into Chautauqua creek of effluent from the proposed sewage disposal plant on condition that no untreated sewage or sewage sludge shall be discharged into the stream and no direct outlets shall be constructed from the septic tank or from the sludge bed to the stream; and that if the sludge bed is underdrained, at least one foot of sand shall be placed over the collecting drains.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *July* 20, 1910.

Board of Trustees, Westfield, N. Y.:

GENTLEMEN: — In response to the application made to me by your board and dated June 20, 1910, asking for my approval of a proposition to construct certain portions of the permanent general system of sewers for the village of Westfield, plans for which were approved by this Department on February 10, 1910, and which application constitutes an application to temporarily omit or defer the construction of the remaining portions of the permanent general sewer system not named in the application, I hereby certify my determination to approve and do approve of such temporary omission from construction, until in the judgment of the State Commissioner of Health or of the trustees of the village of Westfield the construction of such portions may be necessary, of all the remaining portions of the sewer system not named in the application, the portions to be constructed being as follows:

Beginning at the intersection of Main and Portage streets; thence east on Main street to Pearl; thence north along Pearl and East Pearl to the intersection of the sewer along English street; thence east to the junction of English street sewer and the sewer from Cass street; thence north across Lake Shore & Michigan Southern railroad to Bourne street; east on Bourne to Lake street; north on Lake street to village line; thence northwest to Nichols street; thence westerly on Nichols to North Portage street; thence westerly to disposal plant. Also on Main street from Pearl street easterly to first flush tank; thence on Main from second flush tank easterly to Cass street; north on Cass to junction south of the N. Y., C. & St. L. R. R.; thence across said railroad to the junction of the English street sewer. Another sewer beginning on Coburn street north of Main street; thence north to Jefferson street; west on Jefferson to Cass street; all the sewer on West Pearl street; all Jefferson street from Portage street to Holt street; all the sewer on Holt street; Franklin street from flush tank north of Clinton street to Jefferson street and from point a little north of the N. Y., C. & St. L. R. R. to English street; on English street from Franklin to East Pearl; on Washington street

from Maple to Pearl; all of Clinton street; North Portage from Main to Jefferson; South Portage from Main to first manhole south of Bliss; Elm street from Main to Third; Kent street; Union street to Davis; Union street from Main to Third; Davis street, Kent to Nixon; all Cottage and Bank streets; all of Pleasant, Riley, Ash and Wells streets; Spring street, Academy to fifth manhole; Academy street from Main to manhole with elevation 188.35; all of Main street from Water street east 450 feet (this is not shown on map on file in your office); South Water street from Main southerly to a point 200 feet south of the fourth manhole; North Water street from Main street north to disposal plant; Chestnut street south from Main street 1,050 feet; Oak street from Main street northerly to junction with North River street on the south side of the L. S. & M. S. R. R.; West Main street from Oak street to Gale street; all of Clark street, together with the sewage disposal plant.

The above approval is duly given this 20th day of July, 1910, in accordance with the provisions of section 260, article 11 of chapter 64 of the Consolidated Laws, the Village Law.

Respectfully,

ALEC H. SEYMOUR,

Acting Commissioner of Health

YORKVILLE

On August 6, 1910, plans for a proposed sewer system in the village of Yorkville were submitted for approval by the board of trustees. These plans were returned to the designing engineer for amendment, inasmuch as they did not provide for sewage disposal and did not provide for the interception of the existing sewers in the village. The plans were revised and resubmitted for approval on September 14, 1910. After a conference and some correspondence with the engineer the plans were approved on October 7, 1910, and a permit was issued allowing the discharge, into the Mohawk river, of effluent from the proposed sewage disposal plant to be constructed in connection with the proposed sewer system on condition that whenever required by the State Commissioner of Health, complete, detailed plans satisfactory to this Department and showing works for additional treatment of sewage to that provided for by the plans for sewage disposal approved this day shall be submitted to this Department for approval; and any or all portions of such additional sewage disposal works shall be constructed and put in operation whenever required by the State Commissioner of Health.

ALBANY, N. Y., *October* 3, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on the examination of plans for a proposed sewer system and sewage disposal plant for the village of Yorkville, Oneida county, recently submitted to this Department for approval by the designing engineer, Mr. W. G. Stone, C. E., of Utica, on behalf of the board of trustees.

The village of Yorkville is located on Sauquoit creek, the Erie canal and the main line of the New York Central railroad and near the confluence of Sauquoit creek and the Mohawk river. It is bounded on the east by the city of Utica.

The village was incorporated in 1903 when it had a population of 504. The population in 1905 was 524 and the present population is estimated at some 700 persons.

Plans for a comprehensive sewer system for the village were first submitted to this Department for approval on August 6, 1910, but they were not

entirely satisfactory inasmuch as they did not provide for sewage disposal nor for the interception of existing sewers. The slope of the outfall sewer was also too flat to insure securing self-cleansing velocities and the plans furthermore contemplated the interception of a portion of the flow of Martin brook. Although this latter provision would tend to keep the sewers flushed by increasing the depth of flow, it was undesirable inasmuch as it would increase the amount of liquid to be cared for by the disposal works.

At a conference held in this Department in reference to the plans for Yorkville with members of the engineering division on September 1, 1910, the designing engineer was informed that the Commissioner would undoubtedly require some form of sewage purification and that provision be made in the plans for intercepting the existing sewers even though the construction of such intercepting sewer might not be required at this time. He was, therefore, advised to revise the plans in accordance with these suggestions so as to at least provide for settling tank treatment at present, the settling tank to be so placed with reference to elevation and location as to permit of supplementary treatment works should such additional purification of sewage be required at some future time. He was also requested to increase the scope of the outfall sewer to at least 0.15 per cent., to show on the plans an additional sewer line for intercepting the existing sewers which now discharge into Sauquoit creek and to exclude from the proposed sewers the water from Martin brook. The plans were resubmitted on September 14, 1910, revised in general accordance with the above suggestions but the arrangement of the screen and screen chamber was not entirely satisfactory inasmuch as no provision was made for closing off the screen chamber from the remainder of the settling tank while cleaning the rather fine, removable mesh screens. After another conference with the designing engineer revised plans satisfactory to this Department have been resubmitted for approval.

The plans and documents submitted comprise:

Tracing and blue print of the following:

1. Topographical map and plan of existing and proposed sewers and sewage disposal plant.
2. Profiles of streets and sewers.
3. Details of canal crossing.
4. Details of appurtenances.
5. Plan and sections of settling tank.
6. Details of screens.
7. Details of gates, collecting hoods and breeches pipes for inlets and outlets of settling tank. Specifications, report and estimates by the designing engineer.

According to these revised plans and report of the designing engineer, sewers were constructed in certain streets in a portion of the village south of the Erie canal by private individuals in the year 1901. While it is not proposed to intercept these sewers at present, the plans show that they can be intercepted and that the sewage collected by them can be carried across the canal to the proposed sewer in Whitesboro street by a sewer having a slope of 0.96 per cent.

Although the plans provide for a comprehensive sewer system covering practically all of the built up portions within the corporation lines, it is proposed at present to construct only the sewage disposal plant and a portion of the sewer system. Under date of August 4, 1910, the board of trustees of the village submitted a petition to this Department asking permission to omit, for the present, the construction of all portions of the sewer system except the proposed sewers in Whitesboro street, Coventry avenue and outfall sewer, Elmwood and Oatley avenues, Main street and special.

The plans have been carefully examined in reference to sizes, slopes, capacities and other engineering and hydraulic features in connection with the proposed sewers and they are found to be adequate to meet the future requirements for sanitary sewage for the territory to be served by them on the usual assumptions as to population and water consumption and assuming that in the construction, the sewers will be made sufficiently watertight to prevent excess infiltration of ground water.

The plans for sewage disposal show a detailed design for a settling tank to be constructed immediately and provide for additional area to be reserved for supplementary treatment works whenever additional purification of sewage shall be required. The tanks are to be covered with a building to be used as a pumping station when such additional purification works shall be constructed. The settling tank is divided into two compartments which are practically square in plan, and provide for a depth of sewage of about eight feet. Each compartment is adequate to give about eight hours' detention of sewage contributed by a population of 500 persons assuming a rate of water consumption of 100 gallons per capita per day, and about six hours' detention of sewage when serving a population of 700 on the same assumption.

The sewage upon reaching the settling tank can be discharged into either one of the two equal compartments after passing through small screen chambers which occupy a space 6′ x 8′ in adjacent corners of the compartments. The screens are to be composed of 2″ x ⅜″ bars spaced ½″ in the clear. These screens are inclined at an angle of 20° with the vertical and supported at the top by the cleaning platform and rests on a 3″ x 3″ recess in the outer edge of a concrete sill 12″ wide placed about 4′ from the bottom of the screen chamber. This is not a good arrangement for supporting the bottom of the screen inasmuch as they can easily be misplaced and pushed from this narrow recess of the ledge or sill into the screen chamber during cleaning or by floating material from the sewers and when once removed it will be difficult to replace them in their proper position while the tank is in operation.

In order, therefore, to better prevent the screens from being disturbed and to facilitate replacing them when removed a projection should be constructed on the sill to prevent the bottom of the screen from slipping from the end of the sill, or a groove or channel iron could be placed in the side walls of each screen chamber extending from the top of these walls to the sill so as to guide the screens in placing them and to support them when in place.

After the sewage passes through the screens it is discharged from the screen chamber into the settling tank through a submerged outlet 8′x2′, with the bottom of the outlet 16″ from the bottom of the settling tank. The outlet pipe is protected by collecting hoods which act as baffles and prevent the scum from entering the outlet pipe. The effluent from the settling tank is to be discharged into the Mohawk river at the low-water mark through a 15″ outlet sewer laid on a grade of 0.151 per cent.

In conclusion, I would say that the plans provide adequate sewerage facilities for the village for a considerable period in the future, and the sewage disposal plant, if properly constructed and operated, should produce a satisfactory effluent for this type of plant.

I, therefore, beg to recommend that the plans be approved and a permit issued allowing the discharge into the Mohawk river of effluent from the proposed settling tank, and that the permit contain, in addition to the usual revocation and modification clauses and the provision as to future purification of sewage, the condition that the screens shall be set in accordance with the suggestions embodied in this report.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *October* 7, 1910.

BOARD OF TRUSTEES, VILLAGE OF YORKVILLE, *Oneida County, N. Y.:*

GENTLEMEN:— In response to the application made to me by your board under date of August 4, 1910, asking for my approval of the temporary omission from construction of certain portions of the permanent general system of sewers and sewage disposal for the village of Yorkville, plans for which have this day been approved by this Department, I hereby certify my determination to approve and do approve of such temporary omission from

construction until, in the judgment of the State Commissioner of Health or of the trustees of the village of Yorkville, such portions may be necessary, of all portions of said system of sewers and sewage disposal except the sewage disposal plant, the sewers in Whitesboro street, Coventry avenue, and Outfall sewer, Elmwood and Oatley avenue, Main street and "special sewer."

The above approval is duly given this 7th day of October, 1910, in accordance with section 260, article 11, chapter 64 of the Consolidated Laws, the Village Law.

Very respectfully,

EUGENE H. PORTER, M.D.,

Commissioner of Health.

Individual Permits Issued During 1910 Under Section 76 of Chapter 49 of the Laws of 1909, the "Public Health Law" Constituting Chapter 45 of the Consolidated Laws.

LOCATION	To whom issued	Date	Waste matter	Discharged into —
Brasher Falls (town of Stockholm)	Carol A. Curtis	June 22	Distilling water	Squeak brook
Bristol Center (town of Bristol)	Bristol Valley Dairy Association	Dec. 2	Effluent from sedimentation basin	Gully stream and Mud creek
Camden	Proprietors of Camden Creamery	April 20	Effluent from settling tank	Fish creek
Clarkstown (town)	Meister Dyeing Company	Feb. 8	Effluent from chemical precipitation plant	Heyauga lake
Downsville (town of Colchester)	Borden's Condensed Milk Company	June 22	Effluent from sedimentation basin	East branch of Delaware river
Earlville (town of Lebanon)	Mutual Cream and Milk Company	Dec. 19	Effluent from sedimentation basin	Lebanon brook
Ellery (town)	Pauline Abbott	Aug. 11	Effluent from sedimentation tank	Chautauqua lake
	F. O. Anderson	May 24	Effluent from sedimentation tank	Chautauqua lake
	E. J. Boyle	April 20	Effluent from sedimentation tank	Chautauqua lake
	C. L. Bradburn	May 24	Effluent from sedimentation tank	Chautauqua lake
	Clara Brown	May 24	Effluent from sedimentation tank	Chautauqua lake
	C. H. Duncan	May 24	Effluent from sedimentation tank	Chautauqua lake
	George F. Hurlbert	Aug. 11	Effluent from sedimentation tank	Chautauqua lake
	Mrs. Charles Merrill	Aug. 11	Effluent from sedimentation tank	Chautauqua lake
	F. D. Moore	May 24	Effluent from sedimentation tank	Chautauqua lake
	Ralph C. Sheldon	Aug. 11	Effluent from sedimentation tank	Chautauqua lake
	George D. Williams	April 20	Effluent from sedimentation tank	Chautauqua lake
Gilbertsville (town of Butternuts)	Fitch Gilbert, Jr., & Co. Creamery	June 28	Effluent from sedimentation basin	Butternuts creek
Harford Mills (town of Harford)	L. A. Gardiner (cheese factory)	Dec. 2	Effluent from sedimentation basin	Trout brook (branch of Owego river)
Harford Mills (town of Harford)	George Kotcher (Trout Brook Creamery)	Dec. 2	Effluent from sedimentation basin	Trout brook (branch of Owego river)
Herman	Hudson Condensed Milk Company	Sept. 2	Effluent from sedimentation basin	Elm creek (tributary of Grasse river)
Java (town)	Richardson-Beebe Company (butter factory)	Aug. 18	Effluent from sedimentation basin	Tributary of Buffalo creek
Pittsford (town)	Louis C. Forman	Aug. 9	Effluent from sedimentation basin	Stream near factory
Poughkeepsie	The De Laval Separator Company	Oct. 18	Sewage	Hudson river
Rensselaer	Hudson River Aniline Works	April 20	Sewage and manufacturing wastes	Hudson river
Scriba Center (town of Scriba)	Scriba Creamery Association	Dec. 2	Effluent from sedimentation basin	Scriba creek
Shavertown (town of Andes)	Shavertown Creamery Company	Aug. 16	Effluent from sedimentation basin	East branch of Delaware river
Sherburne (town)	Clayton Sisson	April 16	Effluent from sedimentation basin	Chenango river
Wolcott (town of Huron)	Twitchell Champlin Company	June 15	Effluent from sedimentation basin	Dutton creek

GENERAL INVESTIGATIONS RELATING TO SEWERAGE AND SEWAGE DISPOSAL

In addition to the routine of examining and reporting upon plans for sewerage systems and extensions, time-consuming as this work must necessarily be, there is still much work of an educational and advisory nature to be done in connection with it. This educational work is considerable in amount and varied in its nature, and includes numerous conferences with local boards or committees, lectures and talks in connection with sewerage systems and sewage disposal plants, and advice and reports concerning specific local problems. The municipalities where work of this nature has been performed by the Engineering Division during 1910, are as follows:

AKRON

Several complaints having been received by the Department in reference to nuisances caused by the overflow of cesspools in the village of Akron, an inspection was made of the sanitary conditions of the village by one of the inspecting engineers of this Department on June 15, 1910. The findings of this inspection are discussed in the following report, copies of which were sent to the health officer and board of trustees of the village on June 24, 1910.

ALBANY, N. Y., *June* 20, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation of the sanitary conditions of the village of Akron, Erie county.

Several complaints have been received in regard to nuisances caused by overflowing cesspools, and in accordance with your instructions, an inspection of local conditions was made on June 15th by Mr. F. M. Arnolt, inspecting engineer in this division.

The village of Akron, incorporated in 1850, is located northeast of the center of Erie county on the West Shore and the New York Central and Hudson River railroads. It is on the north and east bank of Murder creek, a tributary to Tonawanda creek, which flows into the Niagara. Its population at present is about 1,800, and it is a slowly growing village.

The principal industrial plants are the Akron Manufacturing Company, employing sixty men, Wheat's Ice Cream Company, employing twelve men, a stone crushing plant and Newman's cement works and flouring mill. There are twenty-two stores, two banks and eight hotels in the village.

The water supply is furnished by the municipality and is obtained from a spring. The village owns the land upon which the spring is located and has erected upon it a pumping plant containing two 6-horsepower boilers, one Snow duplex compound pump and one Deming triplex power pump. A

standpipe has been erected by the village about a mile from the pumping station which has a capacity of 100,000 gallons. About 7½ miles of mains, varying between 10" and 4" in diameter have been laid.

Most of the streets are well paved and for the greater portion of the village the natural slope affords satisfactory drainage. At Buell and Chestnut streets, however, the drainage is very poor. Natural gullies collect the rain water from a large section of country and this is led by ditches terminating in short lengths of tile drain to a catch pit located on the northeast corner of Buell and Chestnut streets. A single drain leads from the catch pit to Murder creek. This drain is entirely inadequate to handle the surface wash from heavy rain storms. As a consequence the drainage overflows on the adjacent property owned and tenanted by Mrs. E. M. Cox.

A cesspool on the property of Mrs. Ganyo on the west side of Buell street opposite the premises of Mrs. Cox discharges into an open drain leading to the catch pit mentioned. A well used as a cesspool on the property of Mrs. S. J. Wiltse, located on the southeast corner of Buell and Chestnut streets, discharges into an open drain on the south side of Chestnut street opposite the premises of Mrs. Cox. This is piped under Chestnut street to an open drain on the north side of Chestnut street adjacent to the property of Mrs. E. M. Cox leading to the catch pit mentioned. This cesspool effluent, consisting of sink wastes, remains often for weeks stagnant in the open drains. Putrefaction ensues, giving rise to intensely disagreeable odors. During heavy rain storms the drainage overflows on the property and into the cellar of Mrs. E. M. Cox, carrying with it a large amount of this sink waste which is in a very highly putrefactive state, giving rise to extremely disagreeable and unhealthy conditions.

The village board of health has served notices to abate these nuisances but has failed to press the matter.

Murder creek, running along the southern and western sides of Akron, receives a considerable amount of pollution. Twenty-one drains from cesspools and flush closets on the south side of Main street between Mechanic and Church streets lead directly into the stream. A large number of privies are located on a high bank on the south side of Main street about 100 feet from Murder creek. These are in an extremely insanitary condition. Most of the excreta is washed by the rains into Murder creek.

The general sanitary condition of the village is poor. The favorable location of the village and a water supply which is almost free from possible contamination have prevented any serious results from the existing insanitary conditions. At the time of the inspection over a dozen cesspools were found which were overflowing into open drains or directly into the street gutters. This situation is to be deplored and forms a constant menace to the health of the community. These pools of sewage, one of which was from a foot and a half to two feet deep, two feet wide and over fifty feet long, besides giving rise to disagreeable odors as the sewage undergoes putrefaction, furnish very attractive feeding grounds for flies. The danger from these pests cannot be minimized. Walking over and feeding on the sewage they collect on their feet filth and disease germs and then fly to the kitchen, pantry or table, walk over the articles of food, giving opportunity for infection of food. It is very generally believed that a great deal of the residual typhoid results through the agencies of these pests, aided by the insanitary practices of exposing food and allowing such stagnant pools of sewage to accumulate.

One of the conditions in Akron that most needs remedying arises from the use of wells as cesspools. This practice has become very prevalent. The owner of one property having obtained water from the public supply turns his well into a cesspool. The owner of the next property is still using his well for drinking water with the firm conviction that his supply is as good as that of the municipality's or even better. Akron is in a limestone region and one well almost invariably has a connection through fissures or cracks with those about it. Sewage from the cesspool may find its way into adjacent wells making them deadly sources of infection.

The number of overflowing cesspools in Akron has constantly increased. The unhealthy conditions arising from this makes the construction of a comprehensive sewerage system for the village of Akron a pressing necessity.

A good map of the village showing the streets and houses has already been prepared. Profiles of the streets must be obtained but with the data at hand, the design of a complete sanitary sewerage system and sewage disposal works would be comparatively inexpensive.

The village has a bonded debt of $39,000 and an assessed valuation of $625,525. This leaves over $23,000 available for the purpose at hand, on the basis of the limitation of bonded indebtedness to 10 per cent. of the assessed valuation, available for the purpose at hand.

In conclusion it is evident from the foregoing that the insanitary conditions in Akron are becoming so grave and the need of a sewerage system so urgent that immediate consideration of sewage by the village authorities should not be longer delayed.

The village of Akron should immediately consider the drawing up of plans for a comprehensive and modern system of sewerage with the view of disposing of the same in the most approved manner, these plans to be submitted to the Department for approval. It will be possible and feasible to build at present, subject to the approval of the State Commissioner of Health, only that portion of the works which is necessary from the standpoint of health and economy.

I would, therefore, recommend that the board of trustees of the village of Akron be urged to take up the question of sewerage and cause a comprehensive plan of sewerage and sewage disposal for the entire village to be prepared and submitted for approval. With an approved plan on file such portions of the system as might be found advisable to construct from time to time could be added with the assurance that all expenditures would be in harmony with a permanent general plan.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

CENTRAL ISLIP (State Hospital)

A number of complaints of the insanitary conditions arising from the operation of the Central Islip State Hospital having been made to this Department, an inspection of the disposal plant of the hospital was made by this Department in conjunction with Mr. James H. Fuertes, Consulting Engineer of the Central Islip Protective Association, which was one of the complainants. The inspection was made on October 5, 1909, and a copy of the report of Mr. Fuertes, together with a copy of the letter of transmittal of the Department to the superintendent of the institution, is given below.

NEW YORK CITY, *December* 6, 1909.

Mr. JOHN H. VAIL, *Chairman Islip Protective Association, Islip, N. Y.*:

SIR:—In response to your invitation I visited the Manhattan State Hospital at Central Islip on October 15th, in company with yourself, Mr. B. Welles, Mr. Eugene R. Smith, C. E., and Mr. C. A. Holmquist, Assistant Engineer of the State Department of Health, to make an inspection of the sewage disposal plant at the hospital and to observe its methods of operation.

Dr. G. A. Smith, the superintendent, being absent, we were accompanied on our trip of inspection of the works by Dr. M. B. Heyman, who, on behalf of the superintendent, tendered every courtesy and supplied us with all the information in his possession. We were also accompanied by Senator Hubbs and by the superintendent of the sewerage works.

After a general discussion of the situation with Dr. Heyman, in his office, we visited the sewage pumping station of the North Colony, then passed through the North Colony disposal fields to those of the South Colony, examining on the way the condition of these areas and the methods of distributing the sewage over the ground, and concluding our inspections by a visit to the South Colony pumping station and sewage storage tank.

Description of Sewage Disposal Plant

The State Hospital for the Insane at Central Islip is made up of two sets of buildings, the original group, which houses about 1,500 patients, being known as the North Colony, while the newer group, housing over 4,000 patients, is known as the South Colony. In addition to the patients there are attached to each colony numerous physicians, attendants, foremen, servants and laborers.

For several years the sewage from the buildings of the North Colony was collected in an underground tank whence it was pumped to a pond covering about an acre and allowed to soak into the ground. In 1902 this pond was done away with by the construction of works, planned by the late Mr. George W. Rafter, C. E.

At the present time the quantity of sewage from the North Colony is estimated by the superintendent of sewers to be about 75,000 to 100,000 gallons per day. This is disposed of by pumping it out to fields having an area of approximately 100 acres and scattering it over the area through some 40 2" hydrants located at convenient places. A large part of the area receiving the North Colony sewage is cleared and cultivated and readily absorbs the sewage.

All the sewage from the buildings reaches the pumping station in a fresh condition, the sewers being relatively short; and, after passing through the settling tanks, which holds about one day's flow of sewage is pumped by two duplex double-acting steam pumps through a 10" force main to the irrigation field. The sewage evidently undergoes a degree of septic action in the tanks, though the process is not pushed far. The tanks are cleaned out about once every two weeks, the sludge being buried in trenches in the fields and plowed under. The larger tank has screens which are cleaned off daily. No odors are noticeable about the pumping station.

After reaching the irrigation fields 6" vitrified pipe distributors branch from the force main, each distributor having connected therewith 2" hydrants standing about 2½ feet high above the ground, with a quarter-bend, on top, from which the sewage discharges horizontally. Each hydrant has a control valve and a nipple on the end of the quarter-bend threaded for 2" hose.

The sewage from the South Colony, from 200,000 to 300,000 gallons daily, flows from the main outfall sewer into a receiving or storage tank, about 90'x75' and 10' deep, situated at the edge of the swamp southwest of the hospital buildings, at the headwaters of Winganhauppauge brook, which flows into Great South bay just east of Islip. As it enters the tank the sewage flows through inefficient, unsatisfactory screens. The tank will hold nearly two days' flow of sewage at the present time. Two 6" steam driven direct-connected centrifugal pumps, in a small brick building by the side of the tank, pump the sewage through a 12" force main to the disposal fields about one-third of a mile to the east.

The disposal area for the South Colony extends half a mile to the east of Carlton avenue and is about one mile long from north to south. Its area is approximately 300 acres. This, together with the disposal area for the North Colony, which adjoins it on the north, gives a total area of 400 acres available for sewage disposal.

The sewage is delivered upon the area through 2" hydrants, as in the North Colony field, but instead of being cultivated the land is covered with rather open timber much grown up with underbrush, coarse grasses and ground vines. No great effort is made to secure a proper distribution of the sewage over this area, short ditches, perhaps 50 to 75 feet long, usually leading the sewage to some depression from which it can, in time, soak away. The hydrants are arranged along 6 lines of 6" pipe, running north and south from the 12" force main, there being about 7 hydrants on each line to the south and 5 on each branch to the north of the 12" force main. The arrangement is irregular to correspond with the topography of the area. The land chosen for the disposal area is particularly well suited to the purpose, being of a sandy, gravelly nature and capable, if properly cared for, of receiving large quantities of sewage. The disposal area is not artificially underdrained, the small quantity of sewage, and the porous nature of the soil, rendering this unnecessary.

The Method of Operation

The sewerage works are operated under the direction of a superintendent, assisted by paid employees to run the pumps, at both the North and South colonies, and a few of the better and more tractable patients. At the North Colony pumping station the suction pipe of the pumps only extends down to within about 8" of the bottom of the storage tank so that the sludge accumulating therein has to be cleaned out about twice a year. The accumulations when removed are buried in trenches in the nearby fields. The larger receiving tank is about 30 feet wide by 50 feet long and 10 feet deep and is provided with a screen at the point where the sewage enters. The screenings are buried. The small tank which is only about 3 feet by 5 feet by 20 feet long is provided with screens. The pumps are in duplicate and are 7½" by 8½" by 10" duplex Worthington pumps. They are usually in operation about 6 hours daily. The quantity of sewage received at this station is estimated to be from 75,000 to 100,000 gallons daily, this estimate being based on the amount of water supplied to the colony. The main delivery pipe to the disposal field is 10" in diameter and the branches 6" in diameter. As ordinarily operated the sewage is discharged upon the ground for about a week from half the total number of hydrants and is then turned on for a week through those previously skipped, in this way giving the ground a chance to rest between doses. As practiced, therefore, the sewage is discharged upon the ground continuously for about 6 hours out of the 24 for 7 or 8 days in succession, the land then being allowed to rest for a week before receiving a further dose of sewage.

The writer understands that no trouble has been experienced with the disposal area of the North Colony. This area is largely under cultivation and the sewage is easily distributed so as to avoid nuisances.

The sewage from the South Colony enters the storage tank through screens in a manhole at the center of the north side of the tank. The tank is intended only for storage purposes and is pumped out once a day. The pumps, of which there are two, are of the steam-driven centrifugal type with 6" discharge. They are used alternately. The suction pipes extend down into a sump to a level lower than the bottom of the storage tank; twice a month the tank is pumped out completely and the sides and bottom washed clean with a hose, the wash water being pumped to the disposal field in the same manner as the sewage. Ordinarily it takes about three hours each day to pump the sewage from the tank to the disposal field. This field is operated similarly to the north field excepting that no attempt is made to secure proper distribution of the sewage over the ground. The surface being more or less irregular and being covered in places with grasses, vines, underbrush, as well as with saplings and large trees, makes an even distribution practically impossible unless at considerable expense for superintendence and labor. Pouring sewage on the ground three or four hours a day for a week at a time, where it collects in pools or lies stagnant upon the surface under the grass and brush is not conducive to its proper, odorless absorption. At some of the hydrants, undoubtedly, satisfactory disposal takes place, but at others distinct nuisances existed on the day of my inspection. It is easy to conceive that in hot, humid summer weather, with an easterly breeze, disgusting odors would be noticeable on Carlton avenue, while passing through the grounds of the hospital.

I am informed that the screenings removed from the manhole at the storage tank are disposed of by burial.

Causes of Unsatisfactory Conditions and Complaints

The complaints which have been made against sewerage conditions at the hospital have related to the foul odors, noticeable along Carlton avenue in the summer time, and to the possibility that the prevalence of typhoid fever in portions of Islip and the adjacent villages was attributable in some way to the insanitary condition of the disposal fields.

The odors, as made apparent by an inspection of the disposal area, are due to the improper operation of the works. It would be difficult to find more

suitable conditions for the satisfactory disposal of sewage by broad irrigation than exist at the Manhattan State Hospital at Central Islip. The ground is sufficiently rolling to permit of the spreading of the sewage out over the entire area, and yet not sufficiently steep to favor the washing of the sewage into nearby water courses during rain storms; and the soil is particularly favorable for the reception of moderately large quantities of sewage. The total quantity of sewage pumped to the disposal area per annum would cover it to a depth of about one foot. The average annual rainfall on the same area is nearly four times this depth. There is no doubt, therefore, not only that ample land is available but that the difficulty arises from the improper distribution of the sewage. In some places the confinement of the sewage to relatively small areas resulted in its putrefaction and the evolution of foul and disgusting odors. This condition was in some localities much aggravated by the presence of dense underbrush and close growing vegetation.

Fresh sewage has practically no odor. If the hospital sewage be properly spread out over the extensive area provided for it there will be neither odors nor unfavorable consequences to fear.

It is stated that odors coming from the storage tank at the pumping station have sometimes been noticed along Carlton avenue. I hardly believe that this can be true if no improper practices are followed in regard to the management of the tank. Objectionable odors may possibly be noticed when washing out the tank as a considerable amount of decomposition will have taken place in the sludge upon the bottom and with the wind in the proper direction odors from this might be carried as far as Carlton avenue.

There seems very little probability that the waters of Winganhauppauge brook have ever been directly polluted by the washing of sewage from the disposal area into the brook during heavy rains in the summer time, or over frozen ground in the winter. The only avenue through which contamination could take place directly from the disposal area would be through a very gently sloping depression leading toward the swamp at the head of the brook. In order to reach the brook by this channel of communication, however, the surface water would have to cross Carlton avenue, and there being no culverts or bridges providing for drainage thereunder it is pretty certain that direct pollution of Winganhauppauge brook from the irrigation fields is impossible.

Faults in Management and Carelessness of Employees

Although I was informed that the screenings from the storage tank at the South Colony pumping station were disposed of by burial on land, my personal inspections revealed practices which should be stopped immediately. I observed that it was the habit of the employees to rake the floating matter from the surface of the sewage in the tank occasionally; and marks where these rakings had been dragged over the top of the walls of the tank recently were plainly to be seen. Evidently on some occasions the collections were sufficient in amount to necessitate an attempt at more efficient disposal than letting them drop on the ground outside the wall of the tank. In following paths around through the trees and underbrush in the swamp, to the west of the tank, numerous piles were found where this material had been dumped from wheelbarrows. Several pits were also found in these wet bottoms where offensive materials had been buried. Whether or not all the screenings were disposed of in this manner I am not informed. I observed also that it is the custom apparently to wash the screens across a ditch with a hose, the wash water from the screen finding its way through the ditch directly into the headwaters of Winganhauppauge brook. This practice, as well as the practice of burying the screenings and rakings from the surface of the tank in the swamp at the headwaters of the brook is reprehensible.

It is possible, although it cannot be proven, that some of the typhoid cases in the vicinity of Islip may have resulted from this practice. Winganhauppauge brook, within three or four miles of its source, empties into an estuary of Great South bay at Islip, and I am informed that a considerable proportion of the milk supplied to Islip comes from a dairy farm on its bank. While there is no direct evidence that the typhoid cases of last summer could be

traced to the use of the milk from this farm the situation is sufficiently suspicious to require that the State Hospital authorities exercise the greatest caution to prevent the pollution of the brook at its headwaters by the screenings, washings from the screens and rakings from the surface of the sewage storage tank, as well as from other direct sewage pollution.

The typhoid fever cases in question occurred last August, there having been several cases scattered about principally through the eastern district. The records of the hospital do not show any typhoid cases there just prior to that time, although two cases developed during the first week in September. This, however, is not conclusive one way or the other, as a comparatively large number of typhoid cases in every locality are mild and are not detected. Such patients, being only slightly sick, are in a condition to spread the disease through carelessness. In many of the typhoid epidemics that I have been called upon to investigate the suspicion of an origin of this sort has been strongly indicated. Hence, although no cases of typhoid were recognized among the hospital employees or patients early enough to have accounted for the cases in Islip, it may be possible that the cases which were finally identified in September may have resulted from an infection acquired from a "walking case" at the hospital.

Milk epidemics are sometimes difficult to run down, particularly where the infection has been caused by the washing of the milk containers in slightly polluted water. From such a cause general epidemics are not usual, a bottle containing typhoid bacilli might, for instance, be left at one house, whereas that left at the next, or at several succeeding houses, might contain no infection whatever. Outbreaks due to the contamination of the milk directly by polluted water are of an entirely different nature: these usually leave a trail so plain that it can be followed without difficulty. The means by which a mild milk epidemic might be started are various. Cases might result from the washing of the cans or bottles with water that had been subject to pollution; possibly a slight infection might result from the wading or wallowing of the cows in infected water, and the subsequent brushing of infected dust from their bodies into the milk cans, by the swishing of their tails, or by other indirect means.

Recommendations and Suggestions

Mr. Rafter's report, which probably contained the principles of his design and the method by which the disposal works at the hospital should be constructed and maintained, has not come under my notice, but I feel quite sure that the works have not been laid out and constructed, and especially not maintained, in accordance with his original plans. He undoubtedly intended to have the beds properly cleared and the surface properly prepared to receive the sewage on the broad irrigation plan, or on the natural sand filtration plan, either of which would have been successful, if properly maintained. Instead, however, the field was never even cleared, there being a growth of brush upon it with pooling of the sewage and consequent occasional nuisances.

The present objectionable conditions can be overcome by properly preparing the land and properly maintaining it.

This preparation of the land can be done by removing all brush and vegetation to prepare it:

a. For sewage farming, so-called.

b. For sand filtration proper, laying the surface out in beds with division embankments and proper appurtenances for distribution.

Since the present area is large (if properly laid out, as above, a much less area could be safely utilized) it would be wise to:

c. Discontinue the use of the present area nearest the roadway and confine the application of sewage to the portion of the present disposal field more remote therefrom.

There is necessity for greater care in regard to the operation of the settling tanks. There is no particular objection to operating the tanks as combination settling and storage tanks, providing no opportunity is had for discharging any of the sludge that would settle in the tanks to the disposal field as is now

same. It is possible, perhaps, by this combination of settling and storage to permit of an intermittent application of the sewage to the beds, which might be an advantage.

If the tank were divided so as to form two tanks instead of one it would be possible to pump the effluent continuously to the different portions of the disposal field. I believe that double tanks would permit of a more uniform operation of the whole plant than by the "fill and draw" method, but this does not seem possible without dividing the present tanks so that one could be in operation while the other was being cleaned. On the whole, I am in favor of recommending the division of the tanks into two compartments for the purpose of cleaning, or, if this can not be done, of providing a by-pass so that the sewage could be pumped directly to the field for the short time necessary to clean the present tanks. This short time of application of raw sewage to the beds would probably not seriously injure them.

One other undesirable feature of the present operation is the disposal of septic scum and possibly sludge directly on the surface of the ground near the headwaters of [illegible] brook. This should not be permitted, but these materials should be properly spread upon the ground or plowed in, or otherwise more properly disposed of in a sanitary manner at a considerable distance away from the watercourses.

The foregoing remarks apply to the conditions obtaining or likely to obtain with the present population at the hospital, allowing for a moderate increase in the near future. Judging from the past history of the institution, however, it is not impossible that the numbers of patients and attendants may in a few years increase two or three-fold. Should this be the case the writer is of opinion that the present system of sewage disposal will be unsatisfactory, not because of any inherent defects in the system or lack of sufficient area on which to dispose of the sewage, but more from the difficulty of securing under such conditions proper maintenance of such a large tract of ground.

Few persons realize that in order to secure the inodorous and sanitary disposal of sewage it is necessary to have an intelligent and high grade class of superintendence. Slight neglect will sometimes render an otherwise efficient plant both inefficient and convert it into a nuisance. This is particularly true with respect to plants of types which require the dispersion of the sewage over large areas of ground. Nonodorous and satisfactory disposal of the sewage at the hospital at [illegible] will necessitate great thoroughness and superior intelligence on the part of the superintendent, and should be conducted by labor of a higher grade than is to be found ordinarily in asylum inmates, who generally take little continuous interest in the work which they are given to do.

For the above reasons I am fearful that it will be difficult to maintain the disposal area in a satisfactory condition when the population of the hospital shall have increased considerably; for this reason it is my judgment that the hospital should look forward at no very distant date to the making of such changes or such additions to the plant as will permit the discharging upon the disposal field of a nonputrescible sewage effluent.

The most satisfactory means by which a nonputrescible effluent could be secured would be to add to the present plant, after modifying the storage tank so as to convert it into two settling basins, a set of sprinkling filters and a new [illegible] pumping station to pump the settled sewage to the sprinkling filters. These filters would consist of beds of coarse stones, stones of the size ordinarily used in concrete, the beds being from five to ten feet in depth, depending upon circumstances, and the sewage being spread over the surface of the beds in the form of a spray. During its passage downward through the interstices between the broken stones the sewage is exposed to the air in a very thin film and the character of the organic matter in the sewage is changed so that after leaving the filters it is not in a condition to undergo subsequent putrefaction. Such an effluent could be distributed over the present disposal area with no difficulty, and there would be no likelihood of the evolution of disagreeable odors therefrom, the only unfavorable possibility being that if allowed to collect in pools on the surface for any considerable period, such pools might favor the breeding of mosquitoes. This, however, could easily be prevented with a little care.

Since the art of sewage purification is in a state of development, there being yet much room for improvements over known tried methods, it is possible that some process may come to light which would be more satisfactory than the suggested sprinkling filters for the future treatment of the hospital sewage.

I may say, in a general way, that no method of chemical treatment, barring perhaps some future development in sterilization and disinfection, would be applicable in the case under consideration.

My recommendations, in brief, therefore, are:

As to Changes and Improvements in the Works to Provide for a Reasonable Increase in the Population at the Hospital

1. Abandon the use of the hydrants in the two lines of distributing pipes nearest to and parallel with Carlton avenue.
2. Prepare about ten acres of the disposal field for sand filtration by laying out the surface in beds, with embankments between, locating these beds where the character of the soil is most suitable and where the topography lends itself properly to such treatment, in order to provide for proper winter disposal.
3. Clear the balance of the area of the disposal field, except the portion to be abandoned, by the removal of all brush and vegetation except the trees, which need not be disturbed.
4. Divide the sewage storage tank at the South Colony works into two parts to better facilitate the handling of the sewage and the cleaning of the tanks.
5. It is my understanding that plans for the necessary works would be prepared by the State Department of Health; if not, then the hospital authorities should have the preparation of the disposal fields, and the other alterations suggested, carried out from the plans, and under the general supervision of an expert in sewage disposal matters.

As to Improvements That May Be Required in the Future

6. If it be found that the changes and improvements above suggested prove to be insufficient in the future, further additions should be made to the plant so as to secure a nonputrescible effluent to pump to the disposal field. The installation of sprinkling filters would secure this end.

As to the Maintenance and Operation of the Plant

7. Have the expert who prepares the plans for the suggested changes give proper and detailed written instructions to the superintendent of the hospital as to the proper method of operating the works, and give his personal attention to its operation until the employees are sufficiently skilled to manage the works. Allow this expert to keep in touch with the operation of the plant, through the medium of occasional visits, for such time as may be necessary to insure their proper management.
8. To meet the immediate necessities, the practices with regard to the disposal of scum, sludge and screenings must be changed to avoid any possible contamination of the neighboring streams.
9. Any available labor should be utilized in clearing out underbrush and weeds, and an effort should be made to get a better distribution of the sewage over the ground than now obtains, pending securing appropriations for the permanent improvement of the works.

Trusting that the foregoing suggestions will be of value to your association.

Respectfully,

JAMES H. FUERTES

ALBANY, N. Y., *January* 15, 1910.

G. A. SMITH, M.D., *Superintendent Central Islip State Hospital, Central Islip, N. Y.:*

DEAR SIR:—I beg to call to your attention and to take up with you the question of securing some relief from the present insanitary conditions arising from inadequate means and operation of the sewage disposal plants of the Central Islip (Manhattan) State Hospital at Central Islip.

These plants have at times, and especially during the recent past, been the cause of a number of complaints of the residents of Central Islip and of other persons who have to use the highways which pass in the vicinity of these plants. The conditions surrounding these plants and the methods employed in their management and operation have been carefully inspected not only by engineering representatives of this Department, but also by an expert engineer employed by the Central Islip Protective Association, the members of which are particularly affected by the insanitary conditions arising from these plants and which are especially interested in having these conditions improved.

The inclosed report of Mr. James H. Fuertes, consulting engineer for this association, covering a careful investigation made by him of the construction and maintenance of these disposal plants is accordingly submitted for your careful consideration. The inspections made by Mr. Fuertes were made in company with one of the engineers of this Department, and during the preparation of his report and before expressing the conclusions and recommendations contained therein he conferred with this Department in order that these conclusions and recommendations might be in accordance with the views and opinions of the Department.

This report has been carefully reviewed by our chief engineer, and since the recommendations concerning the changes and improvements which should be carried out in order to remove the insanitary conditions surrounding these sewage disposal plants are in full accord with his views, based upon the inspections and investigations made independently under his immediate direction, I wish to express my approval of it and refer it to you for your careful consideration and action. You will note that the report calls attention to certain defects in the construction of the septic tanks and in the layout of the filtration fields, which make it difficult, if not impossible, to operate the plant efficiently or without producing at times a nuisance in proximity to them. The changes or modifications in construction and arrangement of these plants necessary to remove these difficulties and permit of the efficient and sanitary operation of them are embodied in the recommendations contained on pages 18 and 19 of the report, and it is to these recommendations that I would call your particular attention and consideration, and ask that your board of managers take suitable action to secure the necessary funds to carry out the changes and modifications recommended.

I wish in closing to call attention to a slight misunderstanding concerning the suggestion made in recommendation No. 5, page 18, of the report, that plans for the necessary improvements be prepared by the State Department of Health. As you probably well know, this Department is not in a position, nor has it the funds, to undertake the preparation of such plans. Plans for such work are now prepared by the State Architect, and I would, therefore, suggest that when suitable action has been taken, authorizing this work of construction, that he be requested to prepare the necessary plans.

Trusting that this matter will receive prompt consideration and action by you and the board of managers of your institution, and that you will kindly advise me of the action taken, I beg to remain,

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

CHEEKTOWAGA

Complaint having been made to this Department of the insanitary conditions existing in the town of Cheektowaga, near William and Kennedy road, due to improper sewerage facilities, an inspection was made by the engineering division on September 15, 1910. The findings of this inspection are discussed in the following letter, copies of which were also sent to the complainants.

ALBANY, N. Y., *September* 29, 1910.

Dr. FRANCIS E. FRONCZAK, *Health Officer, Town of Cheektowaga,* 806 *Fillmore Avenue, Buffalo, N. Y.:*

DEAR SIR: — In reference to the insanitary conditions existing in the town of Cheektowaga, near William and Kennedy road, I beg to state that through the recent inspection of this district made by Mr. H. B. Cleveland, Principal Assistant Engineer in this Department, I learn that urgent need exists for the immediate construction of a sewer system in this section of the town either or for prompt action by the town board in abating the extremely insanitary conditions now existing and menacing the health of the residents of the town.

The members of the town board and the board of health will recall that this matter has heretofore been the subject of investigation by this Department, and that a previous communication has been addressed to the board outlining the steps which should be taken to secure proper sewerage facilities for this district.

It appears that the overflow from the cesspools on the grounds of the Felician Sisters' Asylum — an institution accommodating 400, and at times 800 persons — finds its way into the gutters and road ditches and from these ditches overflows onto private property in the neighborhood, thereby creating a decided condition of nuisance and setting up a menace to public health.

I understand that the town board are intending to at once take the proper steps leading to an abatement of the present conditions, and wish, therefore, to point out the procedure to be employed.

It is evident from an inspection of the territory affected that the conditions as to the character of the soil and the high ground water level render the disposal of sewage by cesspools unsatisfactory and insanitary unless the town board of health is compelled by the gravity of the situation, due to the present insanitary conditions, to take action in correcting these conditions that will virtually prohibit the use of inside flush closets in a district enjoying a public water supply, arrangements must be made for, and the residents and taxpayers must unite in, the construction of a public sewer system.

It is apparent that a sewer district should be established in this section of the town since the furnishing of sewerage facilities is the only feasible and economical means for effecting an improvement in sanitary conditions.

Such a district may be established by the town board under the authority granted by article 24 of chapter 62 of the Consolidated Laws or under the provisions of article XI of said chapter, and I consider it advisable in every way for the board of health and the town board to at once take steps for the establishment of such sewer district.

The engineer employed to draw up plans for sewerage and sewage disposal will, of course, make the necessary surveys and secure data as to elevations and available routes for main trunk sewers and a site for sewage disposal works in order that plans may be prepared and presented to this Department for approval.

The plans for sewerage should be accompanied by plans for sewage disposal and, while such sewage disposal plans should show complete treatment works, it is possible when the local conditions have been studied and presented in the report of the designing engineer, that approval would be given to such plans with the understanding that only a portion of the disposal works need be constructed at first.

Further, while the plan for sewerage should include sewers in all developed streets in the sewer district to be formed, it would probably be desirable to construct only the main trunk sewers and more important laterals at first. In this manner the first cost of construction may be reduced to a minimum and at the same time assurance will be had that such sewers as are constructed will form a part of a comprehensive sewer system for the sewer district as established.

Trusting that early action will be taken by the town authorities and assuring the board of the co-operation of this Department in any way possible, I am,

Very respectfully,

EUGENE H. PORTER,

Commissioner

CORNWALL-ON-HUDSON

Complaint having been made to this Department of insanitary conditions due to improper sewage facilities at Cornwall-on Hudson, a representative of the engineering division visited the village on August 3, 1910. The findings of the investigation made by him are discussed in the following report, a copy of which was sent to the village authorities on August 27, 1910.

ALBANY, N. Y., *August* 27, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report on an inspection made by the engineering division in the matter of insanitary conditions in the village of Cornwall-on-Hudson, with special reference to the needs of the village for sewerage.

On August 3, 1910, in accordance with your orders, I caused an inspection to be made of the insanitary conditions which obtain in the village.

This inspection was made by Mr. A. O. True, assistant engineer of this Department, who was accompanied by Mr. L. S. Goodenough, the president of the local board of health, and Dr. P. R. Bowdish, the health officer.

As stated in the report of this division, under date of February 3, 1908, Cornwall is furnished with water from a public supply obtained from mountain brooks. There is, however, no system of sewerage in the village, and the sewage, consisting mainly of sink wastes, is discharged into cesspools on the premises. Outdoor privies with permanent vaults are provided on most of the premises, though some have water-closets. Due to the nature of the ground in the center of the village, which consists of on an average of seven or eight feet of soil underlaid with rock, and the proximity of the cesspools, of which there are many in the center of the village, the soil has become polluted and in some places saturated with the leachings from these pits. The result is these cesspools fill rapidly and overflow and require frequent cleaning.

In the center of the village where the premises are small and the houses built closely together the privies are of necessity close to the dwellings. In many instances the privies are in an insanitary condition, being unprotected from flies, and show evidence of neglect and infrequent cleaning.

I have been convinced for some time past of the urgent need of a system of sewerage for the village of Cornwall-on-Hudson, and the detailed report of the assistant engineer on the conditions above outlined indicates the necessity for eliminating the undesirable methods now in use in that village for the disposal of dangerous wastes. The question of proper and adequate sewerage is very essential to the future welfare of the village on both sanitary and economic grounds, and should not, therefore, be neglected.

Plans for a comprehensive system of sewerage for Cornwall have already been approved by this Department, which would provide a modern sanitary and economic method for the disposal of the sewage of the community.

In conclusion, I recommend that copies of this report be transmitted to the board of health and the trustees of the village of Cornwall-on-Hudson, and that the latter be urged to consider this matter and take definite action with view to constructing a sewer system which will undoubtedly be an asset to the village from the standpoint of health and economy.

Very respectfully,
THEODORE HORTON,
Chief Engineer

EAST SYRACUSE

ALBANY, N. Y., *October* 27, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of amended plans for sewerage and sewage disposal for the village of East Syracuse, Onondaga county, submitted to this Department for approval by the village clerk on behalf of the sewer commissioners on October 3, 1910.

The records of the Department show that plans for sewerage and sewage disposal for the village were approved on December 21, 1900, and that amended plans for sewage disposal were approved on November 11, 1904. Both of these plans provided for pumping and final disposal of effluent into Butternut creek to the east of the village. The sewer system, sewage disposal plant and pumping station were constructed but, owing to the large amount of infiltration of ground water into the system and the consequent excessive cost of pumping, it was deemed necessary by the village authorities to provide for some other means of disposal.

An application was submitted, therefore, to this Department by the sewer commissioners of the village on February 19, 1908, for a permit to discharge sewage into Marcey creek which flows through the western section of the village. On March 7, 1908, the engineering division made an inspection of the construction and operation of the sewerage system and as a result of this inspection recommended the construction of a gravity system with disposal into Marcey creek, also pointing out that this procedure would involve the construction of an intercepting sewer in the southern portion of the village.

Plans for sewerage and sewage disposal, prepared in substantial accordance with the recommendations of this Department were approved on February 18, 1909. These plans provided for a permanent sewage disposal plant to be located near the intersection of James and Manlius streets and beyond the northerly corporation line, and provided also for the construction of a temporary settling tank near the freight branch of the New York Central and Hudson River railroad, with temporary discharge of effluent into Marcey creek. The permit issued in connection with the temporary settling tank provided that the permanent sewage disposal plant, shown by the plans approved on February 18, 1909, shall have been constructed and put into operation on or before March 1, 1914.

The amended plans recently submitted for approval and now under consideration show that it is proposed to construct two permanent settling tanks near the intersection of Elm and Maple streets with a temporary outlet into Marcey creek above its confluence with Headson creek and some 800 feet above the proposed location of the temporary settling tank which it is understood has not been constructed. These plans also provide for the ultimate extension of the effluent pipes from the proposed settling tanks to the contact and filter beds to be located north of the village.

The plans as presented are not satisfactory either from a sanitary or economical point of view inasmuch as the proposed point of discharge is into Headson creek above its confluence with Marcey creek where a smaller degree of dilution would be obtained and therefore be more liable to create a local nuisance in the stream below the proposed settling tanks and, since where a gravity flow can be obtained, two disposal plants are more expensive both to

construct and to operate than one plant. The two portions of such permanent disposal plant, i. e., settling tanks and filter beds, as provided for by these plans, will be so widely separated as to still further increase the cost of operation and will at the same time tend to reduce the efficiency of the plant.

It appears, therefore, that any construction of a permanent nature should be in accordance with the plans approved by the Department on February [illegible], 1909, in view of the careful study that was made of the problem both at the time of the inspection of the sewer system of the village and at the time of the examination of the approved plans referred to.

I, therefore, beg to recommend that the amended plans be disapproved and returned to the village authorities.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

In accordance with the recommendations of this report the plans were disapproved on October 2[illegible], [illegible] and returned to the [illegible] on the same date.

GENEVA

At the request of the [illegible] the Chief Engineer of the Department [illegible] sewerage and water [illegible]

The sewerage [illegible] of public works and [illegible] disposal and water [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

sary for the realty company to arrange with the village whereby application for the approval of plans would be asked for by the village so that some guarantee be given to the State Department of Health that the proposed system of sewers and sewage disposal plant would ultimately come under the supervision of the village and be properly maintained by it.

The inadequate capacity of the proposed contact beds and sand filters to properly care for the future contribution of sewage was also discussed with the engineer. Amended plans and application by board of trustees of the village, asking for the approval of such plans for sewerage and sewage disposal for Hudson Heights, were subsequently submitted for approval and approved on September 22, 1910.

Plans for sewerage and sewage disposal for this sewer district, prepared by the Starr-Patterson Engineering Company, were also submitted for approval, but owing to certain defects the plans were returned to the designing engineers for revision. These plans had not been resubmitted by the end of the year.

LONG BEACH

Request having been made by the engineer for the Long Beach estates that the Department make an inspection of Long Beach, in reference to the proposed sewerage and sewage disposal system, and to advise him in the matter, the Chief Engineer of the Department visited Long Beach on January 7, 1910, and in company with the local engineer inspected the conditions of the new channel on the north side of the island and conditions of the surrounding beaches.

It was suggested to the engineer that an investigation be made concerning tidal flows to show the feasibility of disposing of sewage intermittently at high tide and determine if the sewage would be carried out to sea so as not to return on the incoming tide.

Plans for sewerage and sewage disposal for Long Beach were later submitted for approval and were approved on March 16, 1910.

MARTVILLE

On May 3, 1910, application was received by this Department from George L. Gove, president of the Martville Dairy Products Company, asking for a permit to discharge waste from the creamery of such company at Martville into Little Sodus creek. This application was denied on June 30, 1910, pending the submission of plans for treatment of the wastes. No plans had been received by December 31, 1910.

MORRISTOWN

On June 23, 1910, application was made to this Department by Frank L. Scott, village clerk of Morristown, for the approval of plans for two proposed private sewers in the village. This application was denied on June 28, 1910, on the ground that the plans did not provide for a comprehensive sewer system to be constructed by the proper municipal authorities as contemplated by the provisions of the Village Law. The village authorities were urged to have prepared a comprehensive plan for sewerage and sewage disposal, and it was pointed out that the construction of a public sewer system would afford the best solution of the problem of abating the insanitary conditions caused by the use of cesspools.

On July 11, 1910, application was made to this Department by Alexander L. Lyman, general attorney of the New York Central and Hudson River Railroad Company, asking for permission to discharge sewage into the St. Lawrence river from the railroad station of said company at Morristown. This application was denied on July 13, 1910, on the same ground as that submitted by the village referred to above.

NEW PALTZ

Request having been made by the local health officer that the Department inspect the sewerage conditions of the village, a representative of the engineering division visited New Paltz on September 13, 1910. The findings of this inspection are discussed in the following letter.

ALBANY, N. Y., *October* 4, 1910.

Mr. WILLIAM KAISER, *Secretary Board of Health, New Paltz, N. Y.:*

DEAR SIR: — I am addressing the board of health of the village of New Paltz for the purpose of bringing to the attention of the village authorities and of the citizens of New Paltz the urgent need that exists for the construction of a modern system of sewerage and sewage disposal for the village in order that much needed improvement in the general sanitary conditions of the village may result and the pollution of the ground water, forming the source of supply for many wells in the village, may be lessened.

It appears from the results of the inspections made on September 1st by Mr. L. M. Wachter, Chief Sanitary Chemist in this Department, and on September 13th by Mr. H. B. Cleveland, Principal Assistant Engineer in this Department, that many instances of insanitary conditions exist in the village which would be entirely removed by the proper development of the sewer system of the village.

Laundry and sink wastes are now discharged into gutters at several points and decided conditions of nuisance are created. Furthermore, from the evidence afforded by the analyses of well waters made by the State Hygienic Laboratory in connection with the recent prevalence of typhoid fever in New Paltz, and from a study of the topographical and geological conditions in the village it appears that the present insanitary method of disposing of sewage and household wastes over a large portion of the village results in seriously polluting many of the private wells on which the owners depend for water supply. This menace to health would be greatly lessened if proper sewerage facilities were afforded throughout the village.

Plans for sewerage for the village of New Paltz were approved in 1892 by the then State Board of Health. These plans showed sewers in nearly all the developed streets in the village, but provided for two separate outlets into the Wallkill river, one at the Main street bridge, and one opposite the old Normal School site. While this system of sewerage was not constructed, three separate sewers have been built from time to time, one in Main street discharging into the river at the Main street bridge, a second, the Hasbrouck sewer, being an extension of the old Normal School sewer, and third, serving a section south of Main street.

It would be necessary at the present time to slightly revise the plans for sewerage in order that all sewage might be carried to one point favorable as a site for sewage disposal works, but the cost of having plans prepared would be comparatively slight and with a general plan prepared, incorporating such of the present sewers as might be found feasible, advantage might be taken of the provisions of the Village Law relating to sewerage to construct only the more necessary extensions to the sewer system. In this way the expense to the taxpayers involved in a proposition for the construction of sewers, which must be submitted for their ratification, would be reduced to

a minimum, although vast improvement in sanitary conditions would result from the construction of the sewers and assurance would be had that what sewers were constructed would eventually form a part of a comprehensive system for the entire village.

I trust that your board will at once recommend to the board of trustees that they take this matter up and arrange to submit to the taxpayers a plan for providing better sewage facilities in the village of New Paltz, thereby eliminating as far as possible the present insanitary and costly means for disposing of sewage and household wastes and placing the village in better sanitary condition.

Assuring your board and the board of trustees of every assistance within the power of this Department in bringing about this important and necessary public improvement, I am

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

NYACK

ALBANY, N. Y., *August* 26, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:—I beg to report on an investigation made by the engineering division in the matter of certain insanitary conditions existing in the village of Nyack, Rockland county, which were brought to the attention of this Department by the local health officer, and two of which were the subjects of complaints by citizens of the village.

On August 3, 1910, I caused an inspection to be made of the several localities in question by one of the assistant engineers of this Department. In this inspection he was assisted by the health officer of the village of Nyack. These places are designated in the report of the assistant engineer as follows:

> Privy on premises on Liberty street, occupied by a tenant by the name of Kittle. The cause of complaint made by Mr. George Gates.
>
> Privy on Depew's property on the west side of Mill street, corner of Depew avenue. The cause of complaint of Mr. W. B. Coleman.
>
> Five bungalows, located on unaccepted street on north side of Sixth avenue, west of Broadway on the hill, and owned by Townsend Brothers.
>
> Brook which flows from Burk's pond through the village to the Hudson, a distance of about one and one-half miles. Privy on premises at 151 Cedar Hill avenue.

The privy on the Kittle property on Liberty street is located in the rear boundary of the property some 30 feet from the house and about 30 to 60 feet from the neighboring houses. The vault was, as far as could be seen, built of brick rather loosely laid. There was considerable odor and it appeared as if no care had been exercised in either cleaning the vault or applying any earth, ashes, or other deodorizer.

The privy on Depew's property was found to have been abandoned, and at the time of inspection was filled in with coal ashes. The place was somewhat unsightly in appearance, but there was no appreciable odor in the vicinity.

Insanitary conditions were found to exist upon and in the vicinity of the premises of the five aforesaid bungalows, located on the hill west of Broadway. The village sewerage, though serving the neighboring streets, does not extend up as far as the five bungalows. They are supplied with the village water, but they have no water-closets. In each building the sink water is conducted by water pipes to the privy vaults located some thirty feet from the houses. Several of these waste pipes apparently are not provided with any traps. The privy vaults are in an insanitary condition. They are not watertight nor properly inclosed with brick or stone. They fill with

water from the sinks and overflow, carrying the excremental matter in a stream near the surface and onto the adjacent property. This condition obtained at one of these buildings at the time of inspection. These insanitary vaults are not protected from flies.

The brook from Burk's pond was examined for several hundred feet in the rear of the premises bordering on Main street. Along this section of the stream many waste pipes are discharged directly into it, and its bed is foul from deposits of rubbish, ashes and garbage thrown from the adjacent premises. The water is thereby polluted, foul-smelling and unsightly.

Examination was made of the privy vault on the premises at 151 Cedar Hill avenue, South Nyack. This vault is built of brick, laid in cement, and was in a sanitary condition at the time of the inspection.

In conclusion, I recommend that a copy of this report be transmitted to the board of health of Nyack and that their attention be called to these insanitary conditions here existing, and the urgent necessity of immediate action for their abatement.

Very respectfully,

THEODORE HORTON,

Chief Engineer

On August 26, 1910, a letter, inclosing a copy of this report was addressed to the president of the board of health of Nyack, urging them to take immediate action to eliminate the unhealthy conditions described therein.

PHELPS

On June 13, 1910, an application made to this Department on November 30, 1909, by the Empire State Pickling Company, of Phelps, for a permit to discharge wastes from the sauerkraut factory of said company into the waters of Flint creek, was denied, on the ground that the most effectual way of solving the problem of properly disposing of the wastes from the factory would be by the construction of a modern system of sewerage and sewage disposal by the proper village authorities.

It was pointed out that whereas, under the Village Law, it is necessary that the plans for sewerage should provide for sewers in all streets of the village the same law provides that the construction of certain portions of the system may be deferred on the approval of the State Commissioner of Health. and that in this manner the initial outlay in the development of a comprehensive sewer system may be reduced to a minimum, while by the construction of necessary portions of the system many problems relating to the proper disposal of sewage and wastes now confronting alike the board of health, the manufacturing concerns, and private property-owners in the village may be satisfactorily solved.

On June 13, 1910, the application made to this Department by the Phelps Dairy Association for a permit to discharge wastes from the Phelps Creamery into Flint creek was denied for the same reason that the application by the Empire State Pickling Company was denied.

PORT JEFFERSON

Request having been made by the local board of health that the Department make an investigation of the insanitary conditions existing at Port Jefferson, due to the unsatisfactory sewerage facilities, and to advise them in this matter, a representative of the engineering division visited the village on June 30, 1910, and looked over the sewerage conditions with the town health officer and the chairman of a committee of citizens.

The provisions of the law relating to the establishment of sewer systems outside incorporated villages were explained to the committee, and it was pointed

out to them that after the establishment of a sewer district and sewer commission by a petition to the town board and the approval of plans by the State Department of Health the commission could make application to the State Commissioner of Health to temporarily defer the construction of portions of both the sewer system and sewage disposal plans shown by such approved plans.

The need for a sewer system was pointed out to the committee and they were urged to take up the circulation of a petition for the establishment of a sewer district.

RAVENA

At the request of the local board of health the Chief Engineer of the Department visited Ravena on April 12, 1910, and looked over the sewerage conditions of Ravena and Coeymans with the town board. He also gave an address before the taxpayers in the community on the general question of sewerage, its needs, functions, etc. The local problem was discussed and a general estimate was made as to the probable cost of a sewerage and sewage disposal system.

RAY BROOK

Request having been made by the superintendent of the State Hospital for Incipient Tuberculosis at Ray Brook that this Department make an inspection of the operation of the sewage disposal plant installed at this hospital, a representative of the Engineering Division visited Ray Brook on October 6, 1910. The findings of this inspection are discussed in the following report, copies of which were sent to the superintendent of the Ray Brook hospital and to the Fiscal Supervisor of State Charities on October 31, 1910.

ALBANY, N. Y., *October* 31, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on the operation and efficiency of the sewage disposal plant at the State Hospital for Incipient Tuberculosis located at Ray Brook, N. Y., this plant having been carefully inspected by Mr. Fritz N. Arnolt, Inspecting Engineer with this Department, on October 6, 1910.

Plans were approved by this Department on October 20, 1903, for a settling tank as a preliminary part of a complete sewage disposal system. The tank was built as planned, the effluent discharging into lines of sewer tile drain placed a few inches below the surface of the ground. This system proved inefficient, and the conclusion was reached that the conditions arising at the plant were offensive and prejudicial to the hospital inmates. On June 25, 1906, plans for the extension and improvement of the system by the construction of a dosing chamber with automatic and intermittent siphons and two sand filter beds of about ⅛ acre each were submitted to this Department and approved by it. An additional settling tank and another filter bed of about ⅛ acre were constructed about a year ago. New siphons and two new filter beds of about ⅛ acre each have been installed and constructed this summer. At the time of the inspection the two new filter beds although completed were not yet in operation. No plans for the improvements and extensions put in since 1906 have been submitted for approval to this Department as required by section 14 of the Public Health Law.

The original settling tank is the only one used at present. This has a working capacity of about 10,125 gallons. The present population at the hospital is about 250. Allowing 100 gallons per capita per day as the water consumption, the daily quantity of sewage entering the plant is about 25,000 gallons. This allows a detention period in the tank of about nine and one-

fourth hours. The effluent from the settling tank passes into the dosing chamber, which has two siphons discharging into a gatebox, the gates of which opening to the different beds are operated by hand.

Three sand filter beds were in operation at the time of the inspection. The two new beds, the superintendent stated, would be put in operation very shortly. The sand in the original two beds appears to contain a good deal of loam. These beds were covered with a film of dark, sewage fungi growth. Pools of sewage remain on the beds for extended periods. The beds are raked occasionally. The rate of operation on the beds is about 66,000 gallons per acre per day when the three beds are in operation. With such a light dose the beds should not pool or clog if the sand were of suitable size and quality and the surface film forming on the beds were removed at frequent intervals. To make the two original beds work properly, enough of the present unsuitable sand should be removed and sand of suitable size and quality replaced to remedy the present unsatisfactory conditions and secure efficient operation. It is probable that removing the upper twelve inches of sand on the two original beds, that which has been placed there and appears to be of unsuitable size and quality and replacing it with sand of suitable size and good quality, would improve the efficiency. The beds should also be frequently raked and the surface film accumulating on the beds removed. The sand on the third bed and on the two just constructed, appears to be of good quality. Notwithstanding the above unsatisfactory conditions the effluent appears to be clear and no offensive odor could be detected at the outlet where the sewage is discharged into a small brook.

Summarized briefly I would conclude with regard to the construction and operation of this sewage disposal plant:

1. That the construction of the additional settling tank and of the one filter bed constructed in 1909 and the two filter beds in 1910 were in violation of the Public Health Law, which requires that plans for the construction of all sewerage systems and disposal works shall first be submitted to and approved by the State Commissioner of Health before they are constructed.

2. That the twelve inches of sand recently placed upon one of the filters above referred to is too fine and results in undue clogging of this filter. This sand should be removed and a more suitable sand of coarser grain substituted.

3. That notwithstanding an apparently satisfactory effluent being delivered by these filter beds, some difficulty is experienced, due to insufficient scraping of sewage sludge which accumulates on the surface and which tends to reduce the capacity of the bed and of its proper aeration. These beds should be scraped regularly and thoroughly raked and at frequent intervals and periodically a thin layer of sand removed and replaced with sand of a suitable character.

I beg, therefore, to recommend that a copy of this report be transmitted to the superintendent of the Ray Brook hospital and to the Fiscal Supervisor of State Charities for their consideration and suitable action to carry out the recommendations contained therein.

Very respectfully,

THEODORE HORTON,

Chief Engineer

RIVERHEAD

At the request of the local board of health a representative of the engineering division visited Riverhead on June 29, 1910, and looked over the sewerage conditions of the village with members of the board.

The need of a sewer system was pointed out to them and the provisions of the law explained relating to the feasibility of constructing only such portions of both the sewer system and sewage disposal plant as might be required for immediate use after plans for such system have been approved by the State Commissioner of Health

ROME

The Chief Engineer of the Department visited Rome on November 21, 1910, and in company with the city engineer and the superintendent of water works and sewers looked over the proposed location for the sewage disposal works to be constructed, and also inspected the outlet of the present sewerage system of the city.

THERESA

Request having been made by the local board of health that the Department make an inspection of the sewerage facilities and advise them in the matter, a representative of the engineering division visited Theresa on June 4, 1910. The findings of this inspection are discussed in the following report, copies of which were sent to the village authorities on June 17, 1910, urging them to comply with the recommendations embodied in this report.

ALBANY, N. Y., *June* 10, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your instructions and at the request of the local board of health, I have inquired into the question of sewerage for the village of Theresa, and beg to report thereon as follows:

Theresa is an incorporated village in the northern part of Jefferson county on the left bank of the Indian river, and is on the Rome, Watertown and Ogdensburg division of the New York Central and Hudson River railroad, twenty-three miles north of Watertown, N. Y. The population of the village is about 1,000 and has shown no considerable variation from this number for several years.

The principal industrial plants of the village are a silk mill employing about forty hands, two grist mills, a foundry, a cheese factory, a milk station, a sawmill and a novelty works.

The town has excellent water power facilities. The Indian river has a total fall of about seventy feet in the two falls about 1,000 feet apart, directly opposite the town. At the lower and greater of the two falls a recent development of the water power has been made and is being utilized to generate light and electric power for corporate and private purposes.

The water supply is taken from the Indian river at the middle dam, and pumped to a standpipe in the southern end of the village. The average daily pumpage is about 65,000 gallons. There are 284 taps on the water system and as all the inhabitants of the village are not on the system it is somewhat problematical as to the per capita consumption of water supplied. As near as can be estimated the consumption is about seventy-five gallons per capita per day of those supplied. The bonded indebtedness of the water system is about $19,000.

The general sanitary condition of the village is good. There are 3 to 4 miles of wide macadamized, well lighted streets, and the greater part of the village is on high ground, most of the streets being from 60 to 80 feet above the river. All the main streets in the territory lying between the river and the railroad station have an almost unbroken inclination toward the low land bordering the river below and north of the village. The grades are mostly steep, some few being about 10 per cent.

On June 4, 1910, Mr. A. O. True, assistant engineer of this Department, made a thorough preliminary inspection of the town relative to the question of sewerage urged by the local board of health to eliminate certain insanitary conditions alleged to exist in the lower part of the town.

There are at present some 3,000 feet of sewer which serves the main business streets and part of the upper residential section of the village. The exact alignment and size of this sewer is somewhat uncertain, but it is nowhere greater than 8" in diameter. It was built in the first instance by a few

individuals to serve their property and extended from time to time as other houses were permitted to be connected. At present it discharges through several outfalls into the river some distance below the lower dam.

The lower part of the village has no sewers. This portion of the village is chiefly residential, but comprises the town school occupied by about 200 pupils, the railroad station, a milk station and a small hospital. Most of the houses have the public water supply and water closets. The sewage from these houses is either discharged into cesspools on the premises or directly into a drainage ditch running through the lowest part of the territory and finally reaching the low ground along the river before mentioned. In many instances the cesspools are said to have overflowed into this ditch. In the lower part of the territory in question the water table is high and the ground unsuitable for the construction of safe or satisfactory cesspools. At the time of the inspection conditions along the drainage ditch were not offensive, but the local authorities state that the place is a nuisance in dry and hot weather. Much rain had fallen at the time of the inspection.

The railroad station, in the low part of this area, maintains a wooden vault banked up with cinders into which the sewage from the water-closets is discharged. The schoolhouse has no water-closets, but maintains two large privies with masonry open-back vaults on the top of a steep, sandy bank some thirty feet above the road. The milk station is located a few hundred feet south of the railroad station. From this plant considerable waste has been discharged into several cesspools in the low ground near the railroad track. No information was available as to the average character and quantity of this waste. It is said to consist of a certain amount of whey, and principally washings from milk receptacles. The cesspools are apparently in unsuitable ground and have overflowed into a well-defined ditch leading down through the low land. Though no nuisance was apparent when the inspection was made, complaints have been made of nuisance caused by the waste during hot weather. Complaints have been made by two residents in the vicinity of the railroad station that their well water has been affected, presumably by sewage having been washed into the wells.

Several houses in the southeastern part of the town, located on the high, precipitous bank of the river gorge, discharge sewage from water-closets and drains directly over into the river and in places upstream from the intake crib of the water works.

In consideration of the conditions as outlined above, and shown by the recent inspection to exist in the unsewered portions of the town, I am of the opinion that the village is in need of a modern system of sewerage, designed with a view of serving future as well as present needs.

The existence of drainage in the river from houses on the river bank just above the intake of the water works is a serious menace to the health of the village. Many of the inhabitants of the village consider the water supplied to the town unfit for drinking purposes, and although without a more searching inspection of the condition of the water reaching the intake and in the distributing system it is not possible to state the effect of the above-mentioned pollution, it is obvious that there is an ever-present possibility under favorable conditions of sewage reaching the water supply.

There is a demand among many of the residents in the lower part of the town for a more sanitary method of sewage disposal than is afforded at present by cesspools and open drains. As before mentioned, many of the cesspools are in wet, unsuitable ground and if not frequently cleaned will overflow, the sewage reaching the open drain. Even where the ground is of such a character as to absorb the contents of the cesspools and for a time to satisfactorily dispose of the sewage and house wastes there results a gradual pollution of the surrounding soil.

Disposal of household wastes in cesspools, while being permissible and not necessarily dangerous in a sparsely populated community, are considered by sanitarians as insanitary and uneconomical in a closely populated village. The schoolhouse and the privies connected with it are located near the center of the village, and are used by some 200 pupils during the school terms. They are unprotected from flies, and I consider them insanitary and inefficient for a community of this size.

The question of sewerage for the village of Theresa should be considered immediately by the corporation of that village, and plans drawn up for a comprehensive and modern system of sewerage with a view to disposing of the sewage of the village in the most approved manner, these plans to be submitted to this Department for approval. Such procedure is in accordance with the Village Law relating to sewerage, and whereas, any system proposed should make proper provision for all parts of the village ultimately to be sewered, it will be possible and feasible to build at present, subject to the approval of the State Commissioner of Health, only that portion of the works which are necessary from the standpoint of health and economy.

In conclusion I recommend that the village take such steps as are necessary to carry out the plans as above outlined for the improvement of the sanitary conditions of the community.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

VICTOR

Request having been made by the local board of health that the Department make an inspection of insanitary conditions existing at Victor, Ontario county, due to improper sewerage facilities, and to advise them in the matter, a representative of the engineering division visited Victor on May 19, 1910, and conferred with the local board of health.

A general inspection of the village was made and it was found that at many points the insanitary conditions due to overflow of cesspools and sewage discharge were becoming serious, especially at several business blocks along the main street where, owing to the crowded conditions, there are practically no available sites for cesspools to dispose of the sewage.

The village board of health was urged to take up with the board of trustees the question of establishing a sewer system. The provision of the Public Health Law, in reference to the establishment of sewer systems, was explained to them and it was pointed out to them that, although the law requires that the plans prepared must be comprehensive and cover all portions of the village, the village may construct the whole of the said system, or may temporarily omit any portions thereof until such portions may be necessary, subject to the approval of such omissions by the State Commissioner of Health.

WARWICK

On October 21, 1910, this Department was requested by the local board of health to make an investigation of the insanitary conditions arising from the discharge of sewage into Wawayanda creek. One of the inspecting engineers of the Department visited Warwick on November 14, 1910, and the findings of the inspection made by him are found in the following report. A copy of this report was sent to health officer on November 29, 1910, with a request to urge the local board of health to take up with the board of trustees the matter of the preparation of plans for sewerage and sewage disposal for the village.

ALBANY, N. Y., *November* 17, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR: — I beg to submit the following report on an investigation made at Warwick, Orange county, of a nuisance due to the discharge of sewage into the Wawayanda creek at Warwick.

Wawayanda creek rises in the southwestern part of the town of Chester. Orange county, and flows southwest through Warwick, emptying about seven miles below Warwick into the Pochuck creek. The recent drought had so decreased the volume of water in the stream that very little flow was perceptible and the sewage discharged into it remained there for periods of time. Numerous complaints were received by this Department of the insanitary condition of the stream and the odors arising from it. On November 14th, Mr. Fritz M. Arnolt, inspecting engineer with this Department, visited Warwick and examined the condition of the Wawayanda creek with respect to the discharge of sewage into the stream.

At Warwick the Wawayanda is from a foot to several feet deep and about thirty feet wide. In a distance of about a thousand feet, while flowing through the center of the village, it receives sewage from about thirty pipes sewering single houses or small groups of houses. These houses are located in the business section and most thickly settled portion of the village and the sewers serve several hundred people.

One of these sewers is a 12" pipe, laid in the bed of a small stream locally known as Creamery brook. This discharges the creamery wastes from Mutual's creamery which is located several hundred yards back from the Wawayanda into that creek. Sewers from private houses formerly tapped into this pipe or discharged into Creamery brook, causing a serious nuisance along this brook. The local health board has ordered all persons discharging sewage into the brook, or having connections with the 12" pipe, to remove these connections, discontinue discharging sewage into the brook and build cesspools to receive all their sewage and liquid household wastes. Dr. J. S. Cummins, former health officer of Warwick, stated that as far as he knew the orders of the board of health had all been carried out. There is, however, evidence that sewage or wash water is still discharged into Creamery brook.

There can be no doubt that the discharge of sewage into the Wawayanda creek will create a serious nuisance in the future as it has in the past, especially in the dry period of the year. Unless steps are taken to prevent this discharge of sewage the volume of sewage will doubtless increase and a serious nuisance will be present in the heart of the village, detrimental to the public health and welfare of the residents of the village. The local board of health has the power under section 26 of the Consolidated Public Health Laws to cause the suppression and removal of all nuisances and conditions detrimental to the life and health found to exist within the municipality. Under this section the local board of health can prevent the discharge of sewage into the stream when such discharge constitutes a nuisance.

Such a step, however, unless means were provided for the proper disposal of the sewage would be disadvantageous and a serious handicap to the business and welfare of the village, if not utterly impossible, to carry out without serious inconvenience to the residents affected. Many of the business houses are located so as to face on Main street, and the rear of these buildings is on the edge of the creek, leaving no available space for the construction of suitable cesspools.

The best way to remedy the present conditions is to install a comprehensive system of sewerage and a suitable sewage disposal plant. The insanitary conditions existing in the village are a serious detriment to the health and welfare of the village. Warwick has reached the stage where the population is becoming congested and the older methods of disposal in cesspools and the discharge of sewage into a stream, which is now unable to properly take care of the sewage, are no longer suitable and the installation of a comprehensive system of sewerage and sewage disposal has become an urgent necessity.

In conclusion, I beg to recommend that the board of health of the village of Warwick be advised to take up with the village authorities the matter of the preparation of plans for a comprehensive system of sewerage and sewage disposal for the entire village. These plans should be submitted to this Department for consideration, and when approved a permit will be issued allowing the discharge of the effluent into the Wawayanda creek.

Arrangement can be made, in accordance with the Village Law relating to sewers, whereby only such portions of the system as may seem desirable from time to time need be constructed. In this way the initial cost is reduced to a minimum, while assurance is had that all sewers that are constructed will form a part of a general, comprehensive system of sewers for the entire village.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

YONKERS

ALBANY, N. Y., *November* 16, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a sewage disposal plant on the property of Mr. M. Arndtstein on Two Hundred and Forty-second street near Martha avenue, in the city of Yonkers, and near the New York city line. These plans were submitted on September 28th by Dr. W. S. Coons, health officer of the city of Yonkers, the plans having previously been filed with the city board of health. As may be noted from the correspondence on file in this Department a complaint was received on September 5th (the latter being dated August 2d) from Mr. L. K. Peecock, secretary of the Woodlawn Heights Taxpayers' Association, in which on behalf of the association he made complaint of an alleged public nuisance due to the discharge of an overflow from a cesspool on the property of Mr. Arndtstein into a stream which crosses Two Hundred and Forty-second street and the block between Two Hundred and Forty-second and Two Hundred and Forty-first streets, and flows into the New York city sewer at Two Hundred and Forty-first street.

On receipt of this complaint the attention of the health officer of Yonkers was called to the complaint above referred to, and he was asked to investigate the circumstances surrounding the complaint and to advise you as to the facts in the case, and as to what action had been taken by the city board of health to abate any nuisance found.

Health Officer Coons subsequently reported that Mr. Arndtstein had constructed several houses on McLean avenue and had also constructed a sewage disposal plant on Two Hundred and Forty-second street, through which the sewage from his houses was dicharged, and from which the overflow led to the above described stream. Dr. Coons also stated that previous to the construction of the sewage disposal plant Mr. Arndstein had laid a sewer to serve his houses which connected with the New York city sewer in Two Hundred and Forty-first street, but that the public works department of the city of New York had cut off this sewer connection without notice to the owner of the property and in consequence the sewage had been discharged into vacant lots at the corner of Martha avenue and Two Hundred and Forty-first street. Dr. Coons stated that Mr. Arndtstein had partly cleaned up the vacant lots where sewage was discharged while the sewage disposal plant was in course of construction and had promised to fully abate the nuisance.

The attention of Dr. Coons was then called to the requirement of the Public Health Law, which provides that no discharge of sewage effluent into streams in this State may be caused except under permission from this Department, and his attention was called to the fact that the owner of the premises was responsible for caring for sewage from the houses in a sanitary manner until a public sewer was provided by the city of Yonkers, sewers in this section not having as yet been constructed by the city of Yonkers.

On September 28th, Dr. Coons wrote this Department stating that the construction of the sewage disposal plant without the submission of plans to this Department for approval and the issuance of a permit for the discharge from the plant was entirely due to an oversight, and he submitted for the approval of this Department on behalf of Mr. Arndtstein plans for the sewage dis-

posal plant which had been constructed, said plans having been filed with the inspector of plumbing and signed by the city engineer and the health officer instead of being forwarded to this Department for approval.

In this connection, Dr. Coons stated that he had made arrangements for a conference between Mr. Arndtstein, a committee from the McLean Heights Taxpayers' Association and the Yonkers health department, and assured you that the Yonkers department would promptly cause the abatement of any insanitary conditions resulting from the operation of the disposal plant.

In order that the plans might be intelligently considered, Dr. Coons was thereafter requested to have forwarded to this Department a report describing the design of the plant, the proposed method of operation, the character and relative flow of the stream into which the effluent is discharged, and the number of persons served by the sewer discharging into the plant. On November 4th, Mr. Charles M. Mapes, C. E., who designed the plant for Mr. M. Arndtstein, submitted to you a report describing the design and stating the number of persons to be served by the plant.

The disposal plant as shown by the plans and described by Mr. Mapes consists of a septic tank 12′ x 5′, with a depth of liquid of 9′ 6″, having a capacity of 4,275 gallons, a dosing chamber 4′ x 19′ with a depth of 2′, and a two-compartment cinder and gravel contact filter about 12′ long, with a total effective width of 11′, a depth of 28″ over all and a depth of 18″ below the distributing tile near the surface of the beds. The dosing tank is provided with two alternating siphons for discharging alternately on two filter beds, and the filter beds are provided with two 3″ Miller siphons, having a draft of 13″.

The report of Mr. Mapes states that the plant was designed for a daily flow of 8,000 gallons, equivalent to sewage contribution from 100 people at eighty gallons per person.

With respect to the adequacy and suitability of the plant, it appears that whereas the settling tank is adequate to provide ample sedimentation for the sewage contributed by 100 persons, the filter bed is entirely inadequate, since the rate of operation would be about 2,000,000 gallons per acre per day, or about six or eight times the rate at which a filter of this type should be operated to produce the proper efficiency and to prevent a clogging of the filter and the consequent interruption in a portion of the plant and the setting up of a nuisance in the vicinity of the plant.

Furthermore, it does not appear that the effective depth of the contact filter below the distributing tile is to be used, since this depth is 18″, while the draft of the siphons discharging the effluent from the filter is but 13″.

The filter as designed cannot be properly operated as a contact filter, since the dose from the dosing chamber is three or four times the liquid capacity of the filter, so that all but the very last dose from the dosing chamber will pass directly through the contact filter without any period of contact or "resting full." Even if the dimensions of the dosing chamber were properly designed with reference to the liquid capacity of the filter beds, the beds could not readily be properly operated as contact filters, since the plans show a regular siphon and not a timed siphon to discharge effluent from the beds with which latter type of siphon a proper cycle of operation of the bed might be arranged which cannot be provided for by the plant as shown by the plans.

I beg to report, therefore, from a consideration of the plans and the conditions under which the effluent is to be discharged, that it would not be justifiable for you to grant a permit for the discharge of effluent from this plant by reason of its inadequacy to care for the amount of sewage which it is designed to treat and because of its faulty design.

I would, therefore, recommend that a copy of this report be sent to the designing engineer and that the plans be returned to Dr. Coons, from whom they were received.

With respect to any nuisance which may be caused by the discharge of effluent from the plant as constructed into the stream near Two Hundred and Forty-second street, it is obviously the duty of the board of health of the city of Yonkers to abate any such nuisance, and I would recommend that the health officer of Yonkers be informed that this Department cannot approve

the plans as submitted, for the reasons heretofore stated and, therefore, cannot issue a permit for the discharge of effluent from the plant, and that any public nuisance which may be found to exist by reason of the operation of the plant as constructed, should be abated by action of the city board of health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

In accordance with the recommendations of this report, the plans were disapproved on November 17, 1910, and returned to the health officer of Yonkers. A letter, inclosing a copy of this report, was also sent to the board of health of the city advising them as to their duty in suppressing any insanitary conditions or conditions of nuisances which might arise from the operation of the plant.

YORKTOWN HEIGHTS

Albany, N. Y., *October* 28, 1910.

Eugene H. Porter, M.D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir: — I beg to submit the following report on an inspection made October 17th by Mr. Fritz M. Arnolt, inspecting engineer with this Department, of a sewage disposal plant constructed and maintained at Yorktown Heights by Glennon & Co., contractors, in connection with their work on the Catskill aqueduct construction.

This plant consists of an open settling tank and two sand filters. The sewage from the labor camp above is discharged a few feet from the edge of the settling tank and runs over the ground before entering the tank. This tank, which is about 50 feet long and 35 feet wide, is exposed to sunlight, wind and surface wash. At the time of the inspection the surface of the liquid in the tank was covered with a light green scum, indicating the presence of microscopic organisms due to surface wash. The beds, which are each about 40 feet long and 35 feet wide, were covered at the time of the inspection with sewage. Some laborers from the camp stated that sewage was continually present on the beds. A green scum was also present on the surface of this sewage.

At the time of the inspection an offensive odor was given off from this plant, creating a positive nuisance in the surrounding neighborhood. While the effluent from this plant appears clear, analyses submitted by Mr. Theodore DeLong Coffin, sanitary engineer of the Department of Water Supply, Gas and Electricity, showed that the effluent polluted the stream, a tributary to the Croton supply, into which the effluent was discharged and that B. Coli were present in one-tenth c.c. samples. Furthermore, no plans of this plant have ever been submitted to this Department and no permit has ever been issued by this Department allowing the discharge of the effluent from this plant into the stream, which is a tributary to the Croton supply.

It is evident that as a modern disposal plant this plant can be considered as little more than a makeshift, and is neither correctly designed nor properly operated. Furthermore, it has been constructed in violation of the Public Health Law in so far as that the plans were not submitted and approved by this Department before being constructed, and is a public nuisance.

I beg to recommend that a copy of this report be sent to the Department of Water Supply, Gas and Electricity and that they be notified that this plant constitutes a violation of rules 27 and 28 of the rules and regulations enacted for the protection of the Croton water supply and be advised to take the necessary steps to have the violation abated; also that a copy of this report be sent to the board of water supply of New York city, advising them that this plant has been constructed and is being maintained in violation of the Public Health Law.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

In accordance with the recommendations of this report, letters, inclosing copies of the report, were addressed to the proper New York city authorities. On November 12, 1910, a letter was received from the board of water supply of New York city acknowledging the receipt of the report and stating that the matter was being investigated by their sanitary experts and that on the receipt of the reports of these experts the board would take the necessary action.

In addition to the foregoing, correspondence was had with and advice given in matters relating to sewage and sewage disposal at the following places:

Glen Cove.

Lancaster.

Newark (State Custodial Asylum).

PROTECTION OF PUBLIC WATER SUPPLIES

GENERAL EXAMINATION OF PUBLIC WATER SUPPLIES

The protection of public water supplies will probably always head the list of important duties devolving upon the Sanitary Engineering Division since a pure supply of water has always been accepted among sanitarians as one of the greatest conservers of public health. Indeed, the record of past epidemics of disease traceable to infected water supplies has lost none of its force in the present day in causing the public to realize that whatever else is lacking in the way of municipal cleanliness, a clean and unpolluted water supply should be procured and maintained at almost any cost.

Unfortunately the lay mind does not dwell as often or as conscientiously as it should upon these grave questions and for this reason it becomes incumbent upon the State Department of Health, in addition to the regular duties required of it under the Public Health Law, to perform also a large amount of voluntary work in this field. Considerable work has therefore been devoted to examinations into, and reports upon, special features or problems which have arisen in connection with water supplies not protected by rules and regulations. These have usually been in response to particular requests and in these cases field examinations have usually been made and advice freely given.

Municipalities where examinations into special problems or features have been asked for during 1910 and where advice has been furnished, are as follows:

BLAUVELT (State Rifle Range)

On November 17, 1910, plans for a development of a reservoir site for a new water supply for the State Rifle Range at Blauvelt were submitted for approval by the State Architect. These plans were approved on December 1, 1910, on condition that the privy referred to in the second report given below be removed from the watershed of the proposed reservoir and its contents removed in a sanitary manner.

A letter was also addressed to the commanding officer of the Division of National Guards on December 1, 1910, inclosing a copy of the following report dated November 30, 1910, calling his attention to the recommendations of this report in reference to the rigid patrol necessary to maintain the watershed in a sanitary condition at all times so as to prevent any pollution of the water supply.

ALBANY, N. Y., *November* 30, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a development of a reservoir site for a new water supply for the State Rifle Range at Blauvelt submitted to this Department for approval by the State Architect on November 17, 1910.

The records of the Department show that plans for sewerage, sewage disposal and water supply were approved on July 13, 1910. As noted in my report of July 12, 1910, on an examination of these plans, the State Architect stated that the rifle range would have a maximum permanent population of 125 persons between May and November, with a maximum population of about 500 persons for one day at irregular intervals. It was also assumed by him that a storage capacity of about 15,000 gallons would be ample and that the then proposed water supply, which was to be derived from a driven well 125 feet deep, would be sufficient for the needs of the range, judging from the yield of similar wells driven in the vicinity.

According to the report of the State Architect accompanying the plans for a new supply recently submitted for approval, it appears that the driven well yields only some 10 or 15 gallons per minute, which is inadequate to meet the requirements of the rifle range.

The plans now before the Department and under consideration show that it is proposed to develop an existing pond and tributary creek located near the institution as a source of water supply and do not include details of the new dam, spillway, intake, etc., inasmuch as these will be included in a separate contract for erecting the pumphouse, water tower and pipe lines, and it is presumed that additional plans will be presented for approval showing such additional works. A portion of the existing pond is to be used as a reservoir, the old earthen dam is to be removed and replaced by a concrete dam, the undesirable swampy area east of the pond excluded from the reservoir by banks or dikes formed from the earth excavation of the site and the swamp drained by means of a 14" castiron pipe carried through the reservoir to a point below the concrete dam. The reservoir is to be about 150 feet long by 120 feet wide, and from 2 feet to 4 feet of soil containing large portions of organic matter is to be removed from the bottom so as to obtain a depth of water of not less than 5 feet or 6 feet, and at the same time remove objectionable organic matter from the reservoir site. The sides of the reservoir are to be protected by twelve inches of rip-rap. It is estimated that a storage capacity of about 800,000 gallons will be obtained.

The creek tributary to the present pond is to be intercepted some 600 feet above the reservoir and the water conveyed to the reservoir through an 8" castiron pipe so that the water will not flow through that part of the pond which is not to be cleaned or included in the reservoir site.

Although the watershed of the creek tributary to the existing pond has an area of only about 0.5 square miles, it has been found according to the report of the State Architect, that by actual pumping done by the contractors on the rifle range during the past summer, a minimum flow of about 50,000 gallons can be expected from this source. It is also stated that springs have been found in the bottom of the pond and that the creek is undoubtedly spring fed. It appears, therefore, that this new supply should be adequate as to quantity to meet the requirements of the range on the assumptions used.

An inspection of the watershed of the creek was made on November 29, 1910, by Mr. A. O. True, assistant engineer of this Department. This inspection showed the watershed to be uninhabited, of approximately 0.5 of a square mile in extent, and, with the exception of perhaps sixty acres of cleared land in the vicinity of the pond, completely wooded.

Near the southern part of the watershed are the remains of a ruined dwelling. Twenty or thirty feet from and in the rear of this house is the privy. This privy has no vault. It has been moved some little distance from its former position and its contents are lying on the surface of the ground, which slopes to the stream about 150 feet away. Two other structures were noted in this vicinity — a small electric pumphouse and above it and distant from it some 800 feet, a small concrete reservoir. These structures are pre-

sumably part of some local water works deriving water from a spring or well on this watershed. As to the source of this water, its use, and the effect, if any, on the present or future supply of the watershed were not ascertained. With these exceptions no other permanent structures were found on the watershed.

The northern end of the new reservoir has been excavated to a depth of about four or five feet below the original ground surface to a hard bottom of gravelly clay. The southern end is being excavated and a large quantity of clay, mud, roots and humus material has been taken out. The embankments are being so built as to exclude the swamp water and the water from the northwestern part of the watershed which will be presumably subject to contamination from the buildings of the range.

In view of the careful provisions incorporated in these plans for the exclusion of undesirable drainage and the removal of organic matters from the reservoir, and further, in view of the good sanitary condition of the watershed with the exception of the one instance noted above, I recommend that these plans be approved with the provision that the privy mentioned in this report together with its contents or any other dangerous substances on the premises be removed from the watershed or taken care of in a sanitary manner, and that the ground be disinfected with lime or other suitable disinfectant.

Further, in view of the possibility of conditions endangering the sanitary quality of this water arising from the intermittent and temporary occupancy of the locality by numbers of troops, visitors or the public, I recommend that a copy of this report be transmitted to the proper military authorities, and that they be urged to keep at all times a strict patrol of the watershed to prevent any accidental, careless or willful contamination of the water supply.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

COLD SPRING

ALBANY, N. Y., *July* 22, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to make the following report in the matter of a complaint of the board of water commissioners of the village of Cold Spring concerning certain insanitary conditions alleged to exist on Foundry brook at the reservoir of the Mt. Taurus Park Association, above the point from which the public water supply of the village is taken.

The water supply of the village of Cold Spring is taken from the Foundry brook about one and one-half miles above the village, at which point is located the dam and distributing reservoir owned by the corporation. About half a mile above this reservoir is a low masonry dam built in the summer of 1909 by the Mt. Taurus Park Association and forming a shallow reservoir about half a mile in length and averaging about 400 feet in width. About one mile above this reservoir and on the mountains at an elevation of 640 feet above sea level are two storage reservoirs at the headwater of Foundry brook.

The last named works and the water rights to the stream are controlled by the West Point foundry, which was established in Cold Spring in 1817. There exists an agreement between the village and the foundry whereby the former is permitted to divert a certain amount of water for public uses for which privilege a nominal rental is paid. With the exception of the storage reservoirs and the distributing reservoirs, none of the watershed above the corporation dam is owned by the village or foundry.

On July 21, 1910, I caused an inspection of the stream to be made by one of the assistant engineers of this Department. From this inspection it was found that the reservoir, before mentioned, and owned by the Mt. Taurus Park Association, was formed by the construction of a low masonry dam

across the stream in a low, swampy area adjacent to the highway. Due to the absence of any considerable natural banks to retain the back water from the dam, the area flooded is comparatively large and very shallow. In several places the surface of the water is within a few inches of the grade of the highway. The dam has a spillway, but the same cannot serve as a waste weir, as the water flows over the sides of the reservoir through a stone wall and along the edge of the road at an elevation of 1.5 feet below the crest of the spillway.

The surface of the reservoir was not stripped before filling and contains swamp grass bushes and a few trees. The water around the edges of the flooded area were, at the time of inspection, muddy, and the water filled with abundant growths of blue-green algae. At one point along the west side of the reservoir, the shore was somewhat unsightly from the presence of rubbish and tin cans. Above the reservoir the stream was clear, but below the dam it appeared to have gained a considerable increment of color, presumably vegetable stain.

I am of the opinion that this reservoir of the Mt. Taurus Park Association in its present condition injures the quality of the water for the purposes of a public water supply flowing to it from the storage reservoirs of the West Point foundry. The condition, however, is a natural one and must be distinguished from the more common and dangerous case of the contamination of a water supply by organic matter which results from man's economy. In the present state of our knowledge of the effect upon the human system of drinking water containing the products of decaying vegetation, it cannot be said that water standing in or flowing over an area such as is found in the reservoirs in question has any deleterious effect on the health of those drinking the same, provided that no sewage or refuse from habitations is placed therein. That is, such a condition injures the aesthetic rather than the sanitary quality of the water.

If this be the case, this matter is one for the local authorities to deal with, and it is doubtful if any construction of the Public Health Law would bring it within the province of the official Health Board. In this connection I beg to refer to the following interpretation of sections 70, 71 and 73 of the Public Health Law, rendered in an opinion of the Attorney-General:

> "In my opinion the proper and only lawful construction which can be placed on section *72 of the Public Health Law is that all damages and injury to the owner of any property affected by changes required to be made to comply with the rules of the Department of Health must be ascertained and paid prior to the taking possession of the property, and is a prerequisite to the enforcement of said rules in all cases except such as are a nuisance *in and of themselves*, in which cases the Department of Health would have power and authority outside of sections 70, 71 and 72 * to abate the same. Any other construction would to my mind render the law unconstitutional. In brief, I am of the opinion that the State Department of Health, * * * can make and promulgate rules regulating and controlling the use of premises surrounding the sources in all regards, and that a person violating any of these rules can be punished as provided by the penalties, but before such punishment can be inflicted, the corporation for whose benefit the rules are made and established must pay or tender to the owner of the property affected by the enforcement of such rules an amount equal to all damages for making the changes necessary."

Inasmuch as the water supply of Cold Spring is protected by rules and regulations enacted by this Department, the above opinion would seem pertinent as distinguishing between a condition which on the one hand "in and of itself" is a public nuisance and on the other hand a condition which might be construed as a violation of the rules and regulations if the setting up of the conditions complained of had been specifically prohibited by the rules, and consequently subject to sections 70 and 71 of the Public Health Law, but requiring compensation in the event of the removal of the reservoir. The object

* Section 72 of old Public Health Law is now section 73 of the Consolidated Laws (the Public Health Law).

of such rules is to protect the stream from contamination by the discharge into it of sewage, refuse or any other contaminating substance which constitutes an unreasonable use of the water. It becomes a question, then, as to whether the condition caused by the Mt. Taurus Park Association reservoir could be considered a "reasonable use" of the stream, and such a question would have to be decided by the courts. In any event, the matter is one in which any action taken would necessarily have to be taken by or under the ruling of the local board of health and it is not evident that any action can be taken by this Department, although the resulting conditions due to the construction of the dam should be removed.

I would, therefore, recommend that a copy of this report be transmitted to the board of water commissioners of Cold Spring and that they be advised to take steps to either purchase or obtain partial control of the entire watershed from which their supply is derived.

Very respectfully,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *July* 27, 1910.

Mr. GOUVERNEUR KEMBLE, *Secretary, Board of Water Commissioners, Cold Spring, N. Y.:*

DEAR SIR: — I am inclosing herewith the report of the Chief Engineer on an examination of certain insanitary conditions affecting the water supply of Cold Spring.

As discussed in this report, it is my opinion that the water commissioners must take action in this matter of controlling any conditions on the watershed which do not constitute nuisances in and of themselves.

The conditions which you called to my attention are not such as are covered by the rules and regulations protecting the supply, and even if such conditions were prohibited by the rules, in all probability the courts would determine that compensation must be made to the owners of property for prohibiting what appears to be a proper and reasonable use of the stream on ordinary grounds.

Trusting that your board of water commissioners will at once proceed and enter into some agreement with the owners of the property for the improvement of the conditions now existing, I am,

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

CORNING

The conditions surrounding the Corning water supply were further investigated during the year by the Engineering Division.

This supply has been under investigation at intervals during the past few years with the purpose of improving the condition or the quality of the water. The supply is taken from a large circular well located in the valley not far from the river on the outskirts and just below the city. Chemical analyses of the water taken at intervals during the past few years have shown the water to be contaminated at times, while at others the water is apparently free from this contamination.

Acting upon recommendations contained in a special report by Prof. Ogden, Special Assistant Engineer, the city has made certain improvements in the hope of securing a water of better sanitary quality. Extended investigations, however, seem to prove that notwithstanding the improvements made, the water is still subject to intermittent contamination and in order to correct this the city installed a hypochlorite treating plant for disinfecting the supply.

On April 19, 1910, the Chief Engineer visited Corning and made a further

inspection of the condition of the wells, of the operation of the hypochlorite plant and conferred with the city officials concerning the water supply situation as it then appeared, and making certain suggestions and recommendations for either improving the supply or securing an independent new supply free from any possibility of contamination.

The following statement of facts and of the recommendations made by the Chief Engineer to the city officials during his visit and investigation of April 19 are taken from the memorandum of the Chief Engineer covering his investigation at that time:

The well is situated just below the city in alluvial deposit, and from the topography I should judge is located almost directly in line with the general underground flow of water beneath the city. There are two sewers, one within 500 feet of the well and one within 200 feet of the well. The character of the soil was stated to be alluvial, containing sand, gravel and clay. It was stated that the clay strata has been perforated in many places throughout the city which would give a connection between any underground flow of polluted water above the clay strata and the deeper seated ground-water flow below the strata, in fact, one would expect that pollution of this lower stratum would take place continually and purification would be variable, the analyses apparently supporting this view. As pointed out by the Engineer the position of this well is one which an expert sanitary engineer would not select for a pure supply.

It was found that hypochlorite was not being added regularly as was recommended and understood from the report of Prof. Ogden previously referred to. The inspection of the hypochlorite plant showed that it was not suitable, for the following reasons:

1. On account of having no storage period following application of chemicals, the water being driven directly to the mains.
2. There is no satisfactory opportunity to apply and mix the chemicals in the well and no independent force main extends to the reservoir where the chemicals might more appropriately be applied.
3. There is only one tank used as a mixing tank and a solution tank, the chemicals being dumped into the solution tank and mixed by hand.

It is evident, therefore, that any precipitation of the chemicals during the mixing would result in a more concentrated solution in the lower strata of the tank and hence the application of the chemical to the tank would not be uniform. That this might and does occur was evidenced from the fact that frequent complaints had been made about the taste of chlorine in the water by the residents in the city.

During the conference of the Chief Engineer with the mayor, city attorney and health officials the following views and recommendations were made:

1. The location of the well is unfortunate and must be subject to intermittent pollution.
2. The chemical analyses made during the past few years amply support this view.
3. The conditions are most unfavorable for the most efficacious application of hypochlorite of lime and with the present installation a lack of uniform application of this chemical must necessarily result.
4. That as previously pointed out by the Commissioner of Health, the treatment of water by hypochlorite of lime can not, with our limited knowledge and experience, be recommended as a permanent means of purification and can only be recommended as a temporary or emergency means.
5. That whereas chemical and bacteriological studies might be continued to further prove the extent of pollution, in my opinion there is sufficient evidence to justify the securing of an expert sanitary engineer to make a detailed investigation and report upon the present water supply and means for improving it or of securing a new one of unquestioned purity.
6. That if such an investigation be authorized by the city the engineer should study carefully not only the possibility of improving the present

well supply, which appears to be futile at this time, or of cleaning the same so as to make it safe, but should carefully investigate the development of some new source of supply such as:

a A filtered supply from the Chemung river.

b A driven well supply taken at some suitable point above the city in the Chemung valley or some nearby tributary.

c A gravity supply from some stream in the vicinity which is unpolluted.

In pointing out the desirability of a thorough investigation of the water supply situation by a recognized expert engineer I made it clear to the city officials that the Commissioner would be pleased to review the report of such an expert and give his opinions as to the findings and conclusions reached by such engineer. I pointed out that the situation was a difficult one in many ways and cautioned them to secure the best advice possible. I explained at the same time that neither the Public Health Law nor the appropriation furnished the Department would authorize or warrant the Department in making the detailed investigation necessary for advising the city in a matter of this kind although the Department stood willing to give every assistance possible within its resources.

DELHI

An inspection of the watershed from which the public water supply of the village of Delhi is obtained was made by a representative of the Engineering Division on June 25, 1910, at the request of the water board preparatory to the formulation, by this department, of rules and regulations for the protection of their water supply.

DOBBS FERRY

ALBANY, N. Y., *November* 30, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation of a complaint made by the Paton estate at Dobbs Ferry, Westchester county, N. Y., against the New York Juvenile Asylum, because of the alleged pollution of a stream and springs said to be the source of public water supply, located on the Paton estate.

The Paton estate is located about one mile east of the village of Dobbs Ferry. The water supply in question consists of numerous springs for the most part rising on the Paton estate and the stream fed by these springs and whatever run-off reaches the stream from the watershed — some of the latter lying outside the Paton estate. Below the springs is a small artificial pond which has been used, according to Mr. M. S. Paton, as a source of water supply and ice supply by a considerable number of people. Below the Paton estate pond is another small pond from which it is proposed to obtain a water supply for Miss Master's school, the latter property adjoining the Paton estate. This school has about 400 occupants.

Adjacent to the Paton estate on the south is the property of the New York Juvenile Asylum occupying the top of the hill. This institution is occupied by some 500 boys. It comprises some twenty-eight buildings surrounded by extensive grounds. To the east and directly adjacent to the Paton estate there has been built a new road to the Juvenile Asylum over a right-of-way on property belonging to F. Q. Brown. The ground over which part of this road has been built is of the same general nature as the adjacent wet "spring area" on the Paton estate, several springs discharging directly under the road. The grade of the road at this point is some ten feet higher than the ground surface on the Paton estate side.

In this road has been located the main sewer from the Juvenile Asylum. The sewer is a 10" or 12" vitrified pipe and is said to have been laid about

the year 1901 or 1902. This sewer has leaked in several places and the sewage escaping from it has contaminated the water flowing from the springs under the road. One of these springs known as the Walgrove spring No. 1, has been diverted from the stream by leading the water from it through a castiron pipe to the nearest manhole on the sewer.

Analyses of the water from one of the drain pipes from the road have been made, and it is claimed by Mr. Paton that the evidence shows not only contamination of his water supply from sewage but also a decided depreciation in the quality of the water from the discharge from the storm water passing through the culverts under the road, from the water of the catch basins along the road and also from the drainage of the poultry yards near the headquarters of the stream.

Some 300 feet from the stream on higher ground are the stables and barn belonging to the Paton estate. It is claimed by the superintendent of the juvenile asylum that a certain amount of organic matter is washed from these buildings into the stream, and that analyses show this to be one source of pollution.

The matter of the Paton complaint has been investigated by the village health officer, Dr. Joseph Hasbrouck. In his report to the board of health of the village of Dobbs Ferry, Dr. Hasbrouck recommended the laying of a castiron pipe sewer from a point near the intersection of Walgrove avenue and the road to the asylum to replace the present vitrified pipe sewer for a distance of some five or six hundred feet toward the asylum.

A hearing subsequent to an order of the village board of health requiring the asylum to show cause why they should not cease to pollute the aforesaid water supply, has been held by the village board of health. A hearing is now being held in which the village board of health, the New York Juvenile Asylum and Mr. C. M. Paton are represented by their respective counsel.

The reply of the asylum officials to the order of the board of health is to the effect that the leaks which were discovered by an inspection of the sewer have been repaired. That the sewer was well built in accordance with general practice and subject to the inspection of the board of health; that whatever pollution reaches the stream from surface water above the Paton estate is with the exception of that from the asylum poultry yard only that which is incident to the lawful improvement of the property, and comes only in part from the asylum property; that although they were willing to take all reasonable steps for the prevention of unnecessary pollution from the asylum property, they did not think that the stream in question would, because of its location in a populated watershed, yield a potable water.

Accompanied by Dr. Hasbrouck, the village health officer, Mr. Morgan, the superintendent of the asylum, and Mr. C. M. Paton, Mr. A. O. True, Assistant Engineer of this Department, made an inspection of the stream and the part of the watershed under discussion. No samples of the water were taken for water analysis. The recent records and reports pertaining to this matter were examined at the corporation room and Dr. Hasbrouck and Mr. True were interviewed by Mr. Robinson and Mr. Corcoran, engineers representing the asylum.

At the time this inspection was made, the upper part of the channel of the stream was dry, although one or two of the springs from the roadway embankment were flowing. Although no visible evidences of pollution were noted at this time, it is evident from the inspection that the stream receives the natural run-off from the adjacent properties. Such part of this water as comes from the populated and improved areas of the watershed is subject to surface contamination which may be objectionable even if not dangerous. No leakage of sewage was apparent at the time of the inspection.

Regarding the powers of the local boards of health and the State Department of Health in the conservation of the purity of the waters of the state, the Public Health Law prohibits the discharge of sewage into such waters and provides for the protection of public water supplies and their watersheds by the enactment of rules and regulations by the Commissioner of Health. It also provides for the abatement of conditions declared to be public nuisances.

If this supply can be defined as being a public water supply, the officer, board or corporation having control of the same can require by application to the State Commissioner of Health the enactment of rules and regulations in accordance with section 70 of the (Consolidated) Public Health Law. Such regulations when enacted fix the minimum distance at which buildings, yards, etc., and all the waste substances resulting from man's economy can be placed from the reservoirs and watercourses. The cost of any permanent changes necessitated by the enforcement of such rules and regulations must be borne by the corporation or board benefited thereby.

There remain the questions of the leakage of sewage and the discharge of storm water into the water supply, and as to whether these actually constitute a public nuisance. Under the Public Health Law these are questions under the jurisdiction of the local board of health, and only in case such matters affecting the health of a considerable number of people would it be the duty of the State Commissioner of Health to take action.

From the foregoing, I have come to the following conclusions:

1. That the stream and springs on the Paton estate above referred to do not in my opinion and at the present time constitute a public water supply.
2. That if at some subsequent time this water supply should be so developed or used as to be considered a public supply, the party or parties controlling the same should apply to this department for the enactment of rules and regulations for the protection of the watershed.
3. That the alleged pollution of the water by sewage and storm water to the extent of being or becoming a menace to health or an injury to property are matters, the facts and circumstances of which can only be settled by court procedure.
4. That if it is shown after careful investigation that discharges from the present sewer and storm drains constitute a nuisance, it is the duty of the local board of health to require the abatement of the same.

In conclusion I recommend that the local board of health be required to investigate this matter and to ascertain if there exist any local nuisances and to cause the abatement of any such as are found to exist in accordance with their powers under the Public Health Law.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

In accordance with the above recommendations a copy of this report was sent to local board of health on December 5, 1910, and they were asked to make a thorough investigation and to report to this department as to what action is taken in the matter.

LETCHWORTH VILLAGE

Plans for water supply, sewerage and sewage disposal for Letchworth village were submitted for approval by the State Architect on July 22, 1910, and were approved on July 26th.

Reference is made to page 429 of this report for the report of the Chief Engineer on an examination of these plans.

MONTICELLO

Advices were received of several cases of typhoid fever existing in Monticello during the summer, although they were believed by the local authorities to have been imported. Information was received, however, of the occurrence of pollution of Kiamesha Lake from which the village water supply is derived and the analyses made by the State Hygienic Laboratory showed

considerable contamination of the water. A telegram was accordingly sent to the local board of health on August 3, 1910, requesting them to publish notices in the public press, issue hand bills and post placards advising the consumers of the public water supply to boil all water before using until further notice. A telegram was also sent to the president of the board of water commissioners, requesting that every rule and precaution be enforced immediately to protect their water supply.

The department was advised that immediate steps were taken upon the receipt of these telegrams to prevent pollution of the lake by the removal of pipes from cesspool drains and other sources of pollution and that daily inspections and patrol had been established.

NIAGARA FALLS

ALBANY, N. Y., *June* 10, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation to determine the source of the water supplies for the hotels, restaurants and ice cream and soda water parlors at Niagara Falls, N. Y.

The inspections were made by Mr. Fritz M. Arnolt, engineering inspector, on June 7, 8 and 9, 1910. Thirty-six hotels, twenty-two restaurants and eight soda water fountains and ice cream parlors were included in the investigation. The results are tabulated below under the respective heads of hotels, restaurants and soda water and ice cream parlors.

Only two of the latter are therein noted as served city water direct. The other six used city water filtered by small pressure filters which gave a very clear water, but of doubtful bacterial purity.

Investigation of Water Supplies for Public Places

HOTELS

NAME OF PLACE	Persons served 1 day in busy season	Kind of water served
Capitol, hotel	50+	Ongiara.
Cataract House	1,000	
Clifton, hotel	200–300	Well water and Ongiara. People will drink from taps.
Columbia Hotel	200–300	City water. Goat Island spring water becomes too roily.
Cosmopolitan Hotel	150	Goat Island spring water.
Echota, hotel	100+	Ongiara.
Edwards House	100–150	City water clarified by porcelain crock filter. Occasionally Ongiara and from Johnson's well.
Empire Hotel	100+	City water clarified by patented Pasteur filter.
European Hotel	100+	Ongiara.
Falls Hotel and Rest.	400–500	City water.
Harvey House	50+	Ongiara.
Imperial Hotel	300–500	Spring water. (City water may be served.)
International House	1,000	Condensed steam filtered, three charcoal and sand.
Johnson's House	50–100	Johnson's well.

Investigation of Water Supplies for Public Places — (Cont.)

HOTELS

NAME OF PLACE	Persons served 1 day in busy season	Kind of water served
Kaltenbach, hotel	100–200	Well on Jefferson St.
Lehigh, hotel	50–100	City water clarified by porcelain crock filter of 2 gallons capacity.
Mayle Hotel	50+	Brewery well, artesian.
Nassau Hotel	50+	City water.
N. Y. Central Hotel	50+	Well and Ongiara.
New Walker House	50–100	Ongiara (may serve city water on calls).
Niagara Falls House	50–100	Vartray Crystal water.
Oak European Hotel	200+	Goat Island spring water.
Pacific Hotel	40 (No transients)	City water.
Pittsburgh Hotel	100–200	Well.
Power City Hotel	100+	Well.
Prospect House	75	City water clarified in porcelain crock filters. Unfiltered city water served.
Rapids House	150+	City water when clear. Otherwise Goat Island spring water, Davis and Ongiara waters.
Raines Hotel and Restaurant.	300–400	City water. Use Ongiara when city water becomes too roily.
Richmond House	100+	Table Rock spring and Ongiara.
Robinson's House	50–100	Johnson's well.
Temperance House	300+	Artesian well.
Tower House	300–500	City water clarified by small pressure filter.
Union House	50	Ongiara water.
Vancouver Hotel	100+	Ongiara water.
Watson House	100+	Goat Island spring and bottled water from Niagara Falls Ice and Water Co.
Wayne Hotel	50	Temperance House well.

RESTAURANTS

NAME OF PLACE	Persons served 1 day in busy season	Kind of water served
Adams Restaurant	100–200	Well on Jefferson St.
Allen Restaurant	300–400	City water boiled.
Cascade Cafe	200–300	Johnson's well on Prospect St., and from Davies' well, Canada.
Cataract Restaurant	400–600	City water, when clear. Otherwise Johnson's well.
Chandler's Restaurant	400–500	City water clarified by pressure filter.
Chicago Lunch	150	City water clarified by pressure filters.
Coffey's Restaurant	1,000	City water.
European Restaurant	200	Johnson's well.
Exchange Restaurant	100–200	City water clarified by Clarine Tablets and filtration through cotton.
Hubbard's Restaurant	400	City water clarified by pressure filter.
King's Restaurant	200–300	City water, when clear. Otherwise water from well on Jefferson St.

Investigation of Water Supplies for Public Places — (Cont.)

RESTAURANTS

NAME OF PLACE	Persons served 1 day in busy season	Kind of water served
Keelty's Restaurant.....	20 regulars and some transients.	City water.
Maple Leaf Restaurant.	200	City water (Claimed that filter was being repaired by proprietor. Waitress stated no filter was used).
Mitchell's Restaurant...	200–300	Goat Island spring water.
Neidhart Restaurant....	300–400	Goat Island spring water. Also water from well on Jefferson St.
New England Restaurant	400–500	City water. Use well on Jefferson St when city water becomes too roily.
Old Home Restaurant...	30–50	Well water.
Park Restaurant........	20–40	City water.
Russ's Restaurant......	20–30	Well.
Wagner's..............	100+	Well on Jefferson St.
Whitwell (Board).......	20	City water boiled.
Women's Union........	50–100	City water boiled and "C Clarine."
ICE CREAM PARLORS		
Sarkee Bros............	1,000–1,500	City water, unless it gets too roily. Then use well water.

Six drug stores having soda fountains were visited, and in each case it was found that city water clarified by small pressure filters was used. These drug stores were located on Falls street south of Second street.

No house-to-house investigation of the rooming and boarding places was made. Since there are from 500 to 1,000 or more of these places, this was impracticable in the time available. About a dozen people coming from such places were interrogated and they stated that the water used was either from Goat Island or the city water from the taps. It is the opinion of Dr. Jerauld, health officer of Niagara Falls, that most of these places use city water from the taps.

The small filters used in some of the hotels and restaurants and also in the drug stores are of two general kinds, the porcelain crock filter and the pressure filter. The former consists of two porcelain crocks, one setting on top and fitted into the other. The bottom of the upper one consists of a porous plate through which the water trickles or filters into the lower crock which is used as a retainer or cooler.

The pressure filter consists of a cylinder of natural or artificial porous stone having a hollow core. This is inclosed within an iron cylinder. The water passes into the iron cylinder and filters through the porous cylinder of stone into the hollow core. From here it is lead into a cooler.

Both of these filters give a remarkably clear effluent. The city water before being filtered is very turbid, but in only a few cases was any turbidity noticed after the water had been filtered by the above means.

The other general source of water supply is the spring on Goat Island. This spring is located on the north bank of Goat Island, about 100 yards east of the bridge connecting Goat Island with the mainland. The distance from the spring to the west bank of the American channel at a point where

the river water is at about the same elevation as that of the spring is only seventy feet. The spring is located in limestone which is greatly cracked and fissured. In all probability the water in the spring is river water that has entered by some fissure. This spring has never been known to run dry in summer. This water is used by a great number of people and, considering its geological features, its bacterial purity is questionable.

The bottled waters used are either distilled water, as the Ongiara, or waters from well known springs in New York State and Canada. The wells used are driven wells, ranging in depth from 50 to 150 feet.

In all cases city water is used to wash dishes, glasses and vegetables. In a great many instances ice cut from the river is served in the water on the tables. The larger hotels, however, use hygienic or distilled water ice.

In summary, ten hotels and twelve restaurants used city water, four of which in each instance clarified this water by the use of pressure or stone crock filters. Two restaurants and one hotel stated that they boiled the city water before serving it.

All the soda water and ice cream parlors used city water, but six out of the eight investigated had pressure filters.

Ten hotels, but no restaurants used bottled waters. Eleven hotels and six restaurants used well or spring water other than the Goat Island spring water. Four hotels and two restaurants used water from Goat Island. One hotel used condensed steam filtered through charcoal and sand.

All of the hotels and restaurants using city water stated that they served bottled waters at the periods the city water became roily. The lodging and rooming houses used city water or water from Goat Island spring.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *July* 11, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In connection with our recent investigation of the sources of water furnished guests at hotels and restaurants at Niagara Falls, you directed me to secure additional and definite information concerning the present public water supply of this city, and especially as to the effects and progress recently made by the city officials to secure a pure supply.

In accordance with your request, I beg to state that I detailed one of our inspecting engineers, Mr. Fritz M. Arnolt, to visit Niagara Falls, to inspect its present public supply and to confer with certain of the city officials to secure the information above referred to. The following is a statement of facts so far as they could be learned from an inspection and through hearsay from the city officials:

Niagara Falls is at present being supplied with water by two plants. One is operated by the city and has an intake at the lower end of the hydraulic canal. At present this water is not purified, but distributed in its raw state. Mr. Robbins, the city engineer, stated that a contract had been let for the installation of a hypochloride plant to sterilize this water until a filtered supply could be obtained. There had been some delay in getting this under way, but he expected it to be in operation by the middle of August. This plant, operated by the city, distributes 5,000,000 gallons per day.

The second plant is operated by the Western City Water Works Company, Mr. James H. Macbeth, superintendent, and distributes from ten to eleven million gallons of water per day. It has its intake near the upper end of the power or hydraulic canal. About 4,000,000 gallons of water passes through mechanical filters and is clarified to some extent. No coagulant is used. The other 7,000,000 gallons are by-passed directly into the mains. The super-

intendent stated that he had under consideration the installation of a hypochloride plant to sterilize the water. He stated that he was expecting an engineer from Philadelphia any day to look over the situation and design a suitable plant.

The city of Niagara Falls has let a contract to the Norwood Engineering Company for the construction of coagulating basins and rapid filters to treat 16,000,000 gallons of water a day. This plant is to be located near the southern city line on the Niagara river. The intake extends 2,000 feet into the American channel and is in 18 feet of water. The river at this point is about 6,000 feet wide. A proposition to extend the intake to the Canadian side was defeated last June. The city engineer stated that the present intake is located at the place where the analyses made by the State Hygienic Laboratory showed the purest water, in the American channel, was to be found. The two coagulating basins have a capacity of a million gallons each. Aluminum sulphate is to be used as a coagulant and this is to be followed by a treatment with hypochlorites. A sedimentation period of three hours is provided for. The rapid filters are 16 in number, each having 360 square feet and designed to treat 1,000,000 gallons each, or at a rate of 121,000,000 gallons per acre per day. Estimating on the basis of payments about ⅓ of the plant is constructed. The contract calls for the completion of the plant by August 1, 1910.

The general plans and specifications were drawn up by John W. Alvord and Chas. B. Burdick, consulting engineers, of Chicago. The bid and detailed plans submitted by the Norwood Engineering Company, of Florence, Mass., were accepted, and the contract awarded to them. Their guarantee states that the water shall contain no undecomposed coagulant, shall be clear, bright and practically free from color, odor, turbidity and suspended solids. The filtered water shall contain less than 100 bacteria per c. c. and no B. Coli communis. They are bonded for one year after the plant has been turned over to the city in the sum of $50,000.

The city engineer, Mr. Robbins, stated that it was unofficially understood that the city will supply water to the Western City Water Works Company when the filters are in operation. As this would call for a draft of over 17,000,000 gallons per day the plant would be slightly overtaxed at the outset, as it is only designed for 16,000,000 gallons per day.

Respectfully yours,

THEODORE HORTON,

Chief Engineer

On July 2, 1910, a telegram was sent to the health officer at Niagara Falls, directing him to notify the public of the polluted condition of the public water supply, and on July 8th, he replied that every hotel keeper, restaurant and railroad in the city had been warned by the serving of personal notices and the public had been warned through the press.

In addition, on July 30th and August 1st, copies of the following letter were sent to the proprietors of hotels, restaurants and ice cream parlors in Niagara Falls, as listed on pages 2, 3, 4 and 5 in the foregoing report of the Chief Engineer to the Commissioner, dated June 10, 1910.

> "I desire to call your attention to the polluted and unsafe condition of the water supplies furnished by the city of Niagara Falls and by the Western City Water Works Company of Niagara Falls.
>
> "You are doubtless aware of the fact that the water thus supplied is not at the present time a proper and safe supply to furnish your guests, but I wish to impress upon you and upon the proprietors of other hotels and restaurants in your city the great need of providing a pure and satisfactory water supply to guests until a pure public water supply is available."

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

OGDENSBURG

On February 16, 1910, Mr. Horton, Chief Engineer of the Department, visited Ogdensburg at the request of the water board and Mr. Lord, the superintendent of the water works, for the purpose of being present at a meeting of the taxpayers called to consider the question of securing a new water supply for the city.

During the afternoon, Mr. Horton, accompanied by Mr. Lord and two of the consulting engineers of the city, drove over the grounds, inspecting the proposed locations of filters and stand pipe for the new supply, after which the various questions concerning the recommendations of the consulting engineers for filtration of the St. Lawrence river water were discussed with the water board.

The meeting of the taxpayers in the evening, at which some 150 persons were present, was addressed by Mr. Horton, and Mr. Hazen of the engineering firm of Hazen and Whipple, following which the question of securing a better water supply was discussed generally and fully. Although there has always been a strong sentiment in favor of the filtration of the Oswegatchie river by the taxpayers of the city, the expert opinions and advice seemed to prevail, and it was evident that the majority of the taxpayers present at this meeting were willing to accept the conclusions of the experts and were in favor of a filtration of the St. Lawrence river.

SKANEATELES

ALBANY, N. Y., *November* 22, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR: — I beg to make the following report of an investigation in the matter of certain public water supplies derived from wells along the Skaneateles lake outlet, otherwise known as Skaneateles creek.

There are some six villages (unincorporated) located along the outlet below the village of Skaneateles. These are all in the town of Skaneateles in Onondaga county, near the foot of Skaneateles lake, and about fifteen miles southwest of the city of Syracuse. The present population of these villages aggregates in the vicinity of 2,000 people. There is considerable industrial activity along the outlet, chiefly in the manufacture of woolen cloth, wall paper, wrapping paper and lumber.

The water supplies for these settlements are taken from many wells along the outlet. The majority of these are dug wells though a few are driven. These wells are privately owned and in nearly every case the water is raised by a hand pump. They vary in depth from 16 feet to 34 feet, as far as could be learned. As evidence of the close relation between the water in the outlet and the ground water level it is said that three-quarters of these wells go dry when the water is shut off from the outlet. Most of them are only a few feet from the outlet and apparently extend considerably below the surface of the water in the outlet. Others are somewhat removed therefrom, and in some cases probably wholly above the outlet water level. Were it shown that there exists a close relation between the water levels in the outlet and those in the adjacent wells, and that more or less free interflowage as distinguished from infiltration through soil was probable between the outlet and the wells, it immediately becomes important to know if there is a possibility of frequent pollution of the wells by the flow of water from the outlet through fissures in the shale and limestone underlying the reg[illegible]

The water from the outlet is receiving the unpurified sewage of two sewers at Skaneateles in addition to a number of drains discharging below the lake. It is also receiving the effluent from the septic tank which treats the sewage of the village of Skaneateles. From the corporation line of the village of Skaneateles to the boundary between the towns of Skaneateles and Elbridge the outlet receives the sewage and trades waste from the mills in this region.

In discussing the question of the effluent discharged from the septic tank at Skaneateles village it must be remembered that whereas the septic tank provides one of the best preliminary processes for the purification of sewage, when used alone its function is concerned chiefly with the prevention of nuisances and it does not, nor is it designed to, eliminate fecal bacteria. When properly operated it undoubtedly does remove a comparatively large percentage of these bacteria.

On November 2, 1910, Mr. A. O. True, assistant engineer of this Department, visited the town of Skaneateles, and in company with Doctors Brown and Giles made an inspection of some of the wells in this district.

Samples of water for sanitary analysis were collected from five wells located in different parts of this district and from the outlet near the corporation line, and near the Skaneateles-Elbridge town line. The results of these analyses, together with the results of the analyses of one well and one spring, made in July, 1910, in parts per million, are given on inclosed table.

These results indicate that the wells tested were probably polluted by surface water at the time the samples were collected. All the wells, with the exception of that at the Hartlot Paper Mill, gave positive tests for the colon bacillus, and with two exceptions the bacterial counts were high. The wells tested were located in comparatively widely separated points of the district at various distances from the creek, and the repeated occurrence of the B. Coli type of organism in samples so distributed and taken at two distinctly different times, viz. July and November, 1910, would indicate a contamination of the ground water of this region by surface water. The actual source or sources of this contamination is not so clear, and its determination would require a more extended study than has been given to this matter, or could be given by this Department under the present limitation of its time and resources for such work.

This is a region of shale and limestone, a geological structure which usually admits of the passage of underground water, with little or no filtering action, through fissures or even natural conduits in the rock.

The fact that the elevations of the water table at the wells is influenced by and responds quickly to variations in the quantity and height of the water in the outlet is not proof that there is a flow of water from the outlet to the wells. It is true such a condition might occur during a dry period when the draft upon any well had lowered the water table at that point below the water level in the outlet. But there may be other means of contamination operative which allows surface water or drainage to find ingress to and to contaminate the ground water. Among several ways in which surface contamination might reach the wells may be mentioned seepage of surface water from the watershed above through rifts in the underlying strata to the water in the well, and the washing of contaminated surface material through the loose open well covering. Most of these wells are not provided with water-tight well curbs and some are shallow wells. In short there are in the absence of an extended investigation so many indeterminate factors which may directly influence the quality of a well water supply that it is impossible to trace with certainty the actual cause or causes involved.

From a consideration of the results of the several analyses of these well supplies, in the light of the geology and hydrology of this region, I am of the opinion that:

1. The wells in this region are subject to contamination by surface waters.
2. That the results of the present investigation give no certain index to the exact source or sources of this contamination, but that it may be due to the seepage of surface waters through a fissured substratum above the wells or from the creek below the wells, or from a local washing in of organic matter from the open coverings of the wells.

I, therefore, recommend that a further study of local conditions be made by the owners of the water supplies with a view to determining the sources of pollution. Further, in the event that it is shown to be impracticable to remove the sources of pollution or otherwise remedy the danger therefrom, these settlements be advised to develop new sources of supply.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

In accordance with the recommendations of this report a copy of the report was sent to local health officers on November 26, 1910, urging that the board give the conclusions and recommendations contained therein immediate and careful consideration.

WATERLOO

Subsequent to, and as, the result of the report of this Department transmitted on November 11, 1909 (see Thirtieth Annual Report, Vol. II, p. 356), on an investigation of the village water supply, the village board of health and board of trustees met in joint session to consider the matter. The report of the special assistant engineer, who was present at this meeting, is as follows:

ITHACA, N. Y., *January* 14, 1910.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to report that in accordance with your directions, I visited the village of Waterloo, Thursday, January 13th. and conferred with the board of trustees and the board of health, in joint session, on the subject of their water supply.

I found that your report had been already read aloud to both boards and that they generally acquiesced in it, except for the minor grievances already pointed out by the health officer.

Upon the invitation of the president of the village I took the chair and expressed to the meeting, as well as I could, not only the desire of the Department, but also their sense of responsibility, to have the present condition of the quality of the water improved. I pointed out that when, as in this case, the water supply was in the hands of a private company, no direct move was possible by which that company could be forced to modify or improve existing conditions. I added that in some cases indirect methods might be employed and cited, without names, instances where the agreements of the franchise by which the company guaranteed to furnish "wholesome and palatable water" had been invoked to force the water company to make improvements.

I suggested the possibility of a refusal to pay hydrant rentals if the other terms of the franchise were not carried out.

It appeared that the president of the board of trustees had no definite knowledge of the terms of the franchise, of its period, or of any of its particulars. After investigation it was found that the terms of the franchise required the company to furnish "pure and wholesome water," and that the

franchise was limited for twenty years, being granted in 1885. It appeared, therefore, that while evidence might be obtained by which to cancel the franchise under which the company is now operating, such action would not be necessary because of its lapse.

It would further appear that the water company is indifferent to the needs of the community, being controlled by nonresidents, and that it is not likely that they will be persuaded to take any desired action.

As a result of the discussion two committees were appointed, one of whom is to confer with the president of the water company, in order to ascertain what steps, if any, the water company will take, leading toward an improved supply; the other committee was directed to examine into and report on the terms of the franchise and the possibility of inaugurating a movement for a municipal water supply.

I inclose herewith the correspondence sent me in this matter.

Yours respectfully,

H. N. OGDEN,

Special Assistant Engineer

In addition to the foregoing, correspondence was had and advice was given in matters relating to the quality of the water supply at a large number of municipalities in the State.

PREPARATION OF RULES FOR THE PROTECTION OF PUBLIC WATER SUPPLIES

Perhaps the most important provision of the Public Health Law relating to water supplies is the enactment by the State Commissioner of Health of rules and regulations for the protection from contamination of public water supplies when application has been duly made by the proper authorities having control of these supplies, and during 1910 applications were received and rules and regulations prepared for enactment in the cases of the following municipalities:

Delhi	Cortland	Cooperstown
West Carthage	Syracuse Suburban Water Co.	Haverstraw Water Supply Co.
Deansboro		

These applications were received in the latter part of the year, and since it is necessary in each case to carefully inspect the watersheds, and customary to submit drafts of these rules for consideration and comment of local authorities, these rules and regulations were at the close of the year enacted only in the cases of the Syracuse Suburban Water Co. and the Haverstraw Water Supply Co., the remaining ones being at this time in the hands of the local authorities for consideration.

ABSTRACT OF THE NEW YORK STATE PUBLIC HEALTH LAW PROVIDING FOR THE PROTECTION FROM CONTAMINATION OF THE PUBLIC WATER SUPPLIES THROUGHOUT THE STATE. CHAPTER 45 OF THE CONSOLIDATED LAWS (PUBLIC HEALTH LAW)

"§ 70. *Rules and regulations of department.*— The state department of health may make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the state. If any such rule or regulation relates to a temporary source or act of contamination, any person violating such rule or regulation shall be liable to prosecution for misdemeanor for every such violation, and on con-

viction shall be punished by a fine not exceeding two hundred dollars, or imprisonment not exceeding one year, or both. If any such rule or regulation relates to a permanent source or act of contamination, said department may impose penalties for the violation thereof or the noncompliance therewith, not exceeding two hundred dollars for every such violation or noncompliance. Every such rule or regulation shall be published at least once in each week for six consecutive weeks, in at least one newspaper of the county where the waters to which it relates are located. The cost of such publication shall be paid by the corporation or municipality benefited by the protection of the water supply, to which the rule or regulation published relates. The affidavit of the printer, publisher or proprietor of the newspaper in which such rule or regulation is published may be filed, with the rule or regulation published, in the county clerk's office of such county, and such affidavit and rule and regulation shall be conclusive evidence of such publication, and of all the facts therein stated in all courts and places.

" § 71. *Inspection of water supply.*— The officer or board having by law the management and control of the potable water supply of any municipality, or the corporation furnishing such supply, may make such inspection of the sources of such water supply, as such officer, board or corporation deems it advisable, and to ascertain whether the rules or regulations of the state department are complied with, and shall make such regular or special inspections as the state commissioner of health may prescribe. If any such inspection discloses a violation of any such rule or regulation relating to a permanent source or act of contamination, such officer, board or corporation shall cause a copy of the rule or regulation violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation shall notify the state department of the violation, which shall immediately examine into such violation; and if such person is found by the state department to have actually violated such rule or regulation, the commissioner of health shall order the local board of health of such municipality wherein the violation or the noncompliance

occurs to convene and enforce obedience to such rule or regulation. If the local board fails to enforce such order within ten days after its receipt, the corporation furnishing such water supply, or the municipality deriving its water supply from the waters to which such rule or regulation relates, or the state commissioner of health or the local board of health of the municipality wherein the water supply protected by these rules is used, or any person interested in the protection of the purity of the water supply may maintain an action in a court of record, which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred by such violation, and for an injunction restraining him from the continued violation of such rule or regulation.

"§ 73. *Sewerage.*— When the state department of health shall for the protection of a water supply from contamination, make orders or regulations the execution of which will require or make necessary the construction and maintenance of any system of sewerage, or a change thereof, in or for any village or hamlet, whether incorporated or unincorporated, or the execution of which will require the providing of some public means of removal or purification of sewage, the municipality or corporation owning the water works benefited thereby shall, at its own expense, construct and maintain such system of sewerage, or change thereof, and provide and maintain such means of removal and purification of sewage and such works or means of sewage disposal as shall be approved by the State Department of Health. When the execution of any such regulations of the state department of health will occasion or require the removal of any building or buildings, the municipality or corporation owning the water works benefited thereby shall, at its own expense, remove such buildings and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any property the municipality or corporation owning the water works benefited thereby shall make just and adequate compensation for the property so taken or injured. Until such construction or change of such system or systems of sewerage, and the providing of such means of removal or purification of sewage, and such work or means of sewage disposal and the removal of any build-

these rules is intended to mean and refer to the impounding and distributing reservoirs at Stony Point, and to any additional reservoirs which may be constructed on Cedar Pond brook or any of its tributaries. The term "watercourse," wherever used in these rules, is intended to mean and include every spring, pond (other than the artificial reservoirs and filter basins), stream, ditch, gutter, or other channel or permeable pipe or conduit of every kind. the waters of which when running, whether continuously or occasionally, eventually flow or may flow, into the water supply of the said Haverstraw Water Supply Company.

Wherever a linear distance of a structure or object from a reservoir or from a watercourse is mentioned in these rules it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of a reservoir, or to the edge. margin or precipitous bank forming the ordinary high-water bank of such watercourse.

Privies Adjacent to any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain with its nearest point within fifty (50) feet of any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed, maintained or allowed to remain with its nearest point within one hundred and fifty (150) feet of any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company.

3. Every privy, privy vault, pit, cesspool or other receptacle or place used for the temporary storage of human excreta which is constructed, located, maintained or allowed to remain within the limiting distance prescribed and stated by rule (2) from which privy, or other receptacle the excreta are not at once removed automatically by means of suitable watertight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely water-tight condition and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid temporary receptacles permitted under rule (3) shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specially ordered or permitted by the State Department of Health the excreta collected in the aforesaid temporary receptacles permitted under rule (3) shall, when removed, be disposed of by burying in trenches, or by thoroughly digging it into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at distances not less than three hundred (300) feet, horizontal measurement, from the high-water mark of any reservoir, or not less than two hundred (200) feet from the edge, margin, or precipitous bank of any watercourse of said water supply.

6. Whenever it shall be found that owing to the character of the soil or of the surface of the ground, or owing to the height of flow or of subsoil or surface water, or other special local conditions, the excremental matter from any privy or aforesaid receptacle, or from any trench or place of dis-

posal, or the garbage or wastes from any dump, may, in the opinion of the State Commissioner of Health be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta or the said trench or place of disposal or the said garbage or waste dump, shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, etc.

7. No house slops, bath water, sewage or excremental matter from any water-closet, privy, or cesspool shall be thrown, placed, led, conducted, discharged or allowed to escape or flow from any pipe, drain or ditch either directly or indirectly into any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company, nor shall any such matters be thrown, placed, led, discharged or allowed to escape or flow onto the surface of the ground or into the ground below the surface within three hundred (300) feet of any such reservoir or watercourse.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothing, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company; nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company, within one hundred (100) feet of any such reservoir or within seventy-five (75) feet of any such watercourse.

9. No clothing, bedding, carpets, harness, vehicle, receptacles, utensils, nor anything that pollutes water, shall be washed, rinsed, or placed in any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe in any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company, nor shall any animals or poultry be allowed to stand, wallow, wade or swim in said reservoir or watercourse, nor be washed therein.

11. No stable for cattle or horses, barnyard, hog yard, pig pen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap, shall be constructed, placed, maintained or allowed to remain with its nearest point less than one hundred and fifty (150) feet from any reservoir, or fifty (50) feet from any watercourse of the water supply of the Haverstraw Water Supply Company; and none of the above-named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such manner that the drainage, leachings, or washings from the same may enter any such reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for the distance of not less than one hundred and fifty (150) feet before entering any such reservoir, nor less than fifty (50) feet before entering any such watercourse.

12. No human excrement or compost containing human excrement shall be thrown, placed, or allowed to escape into any reservoir or watercourse, nor to be placed, piled or spread upon the ground, or dug or buried in the soil, within a distance of three hundred (300) feet from any reservoir, or two hundred (200) feet from any watercourse of the water supply of the

Haverstraw Water Supply Company; and no manure or compost of any kind shall be placed, piled, or spread upon the ground within one hundred and fifty (150) feet of any such reservoir, or fifty (50) feet of any such watercourse.

13. No decayed or fermented fruit or vegetables, cider mill waste, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse, nor shall they be thrown, placed, piled, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse of the water supply of the Haverstraw Water Supply Company, without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above-mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred (100) feet before entering any such reservoir or fifty (50) feet before entering any such watercourse.

Dead Animals, Offal, Manufacturing Waste, Etc.

14. No dead animal, bird, fish, or any part thereof, nor any offal or waste matter of any kind, shall be thrown, placed, discharged or allowed to escape or to pass into any reservoir, or watercourse of the water supply of the Haverstraw Water Supply Company; nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings, or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering any such reservoir, or one hundred (100) feet before entering any such watercourse.

Fishing, Boating and Ice Cutting

15. No fish shall be taken from any reservoir or watercourse, nor shall any person fish in any reservoir or watercourse or through the ice upon the same, nor trespass upon the waters of any reservoir or watercourse or the ice thereon, nor maintain or use any boat or boats thereon except the officials or duly authorized employees of the Haverstraw Water Supply Company in the exercise of their duties in the management and operation of the reservoirs; nor shall any person or persons cut or remove any ice from any of the reservoirs which form or are tributary to the sources of the public water supply furnished by the Haverstraw Water Supply Company.

Inspection

16. The Haverstraw Water Supply Company, through its superintendent or other duly authorized official, shall maintain systematic and thorough inspection of the reservoirs and streams and of the entire drainage area tributary thereto, for the purpose of determining whether the above rules are being complied with. At least two such inspections shall be made each year and such others as may be directed by the State Commissioner of Health, or as may be deemed necessary by the Haverstraw Water Supply Company to insure the maintenance of the watershed in a safe, sanitary condition. A full and detailed report of each such inspection, including a statement of each violation or noncompliance with the rules, shall be submitted in writing to the State Commissioner of Health within ten days after the completion of such inspection.

Penalty

17. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law) the penalty for each and every violation of, or non-

compliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at one hundred ($100) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the Haverstraw Water Supply Company of Haverstraw, Rockland county, N. Y., were duly made, ordained and established on the 14th day of July, 1910, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York.

EUGENE H. PORTER, M.D.,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Rockland county, and at least one newspaper in Orange county, and the affidavit of the printer, publisher or proprietor of each newspaper in each county in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the Haverstraw Water Supply Company.

SYRACUSE SUBURBAN WATER COMPANY

Rules and regulations for the protection from contamination of the public water supply furnished by the Syracuse Surburban Water Company from Otisco Lake in Onondaga county.

GENERAL REGULATIONS

The rules and regulations hereinafter given, duly made and enacted in accordance with sections 70, 71 and 73 of chapter 45 of the Consolidated Laws (the Public Health Law), as heretofore set forth, shall apply to the entire drainage area of Otisco lake which forms the source of the water supply developed, furnished and controlled by the Syracuse Suburban Water Company, of Syracuse, N. Y.

The term "lake" wherever used in these rules is intended to mean Otisco lake. The term "watercourse" wherever used in these rules is intended to mean and include every spring, pond, lake (other than Otisco lake), stream, ditch, gutter, or other channel or permeable pipe or conduit of every kind, the waters of which when running, whether continuously or occasionally, eventually flow, or may flow, into Otisco lake.

Wherever a linear distance of a structure or object from the lake or a watercourse is mentioned in these rules it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of the lake, or to the edge, margin or precipitous bank forming the ordinary normal high-water mark of such watercourses. High-water mark of the lake shall be construed as a flow line, established and laid down upon a map by the Syracuse Suburban Water Company, filed in the Onondaga county clerk's office to which reference is hereby made for a more particular description, said flow line being at an elevation of 789.6.

RULES AND REGULATIONS

Privies Adjacent to any Reservoirs or Watercourses

1. No privy, privy vault, pit, cesspool or any other receptacle of any kind or place used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain

on the banks or shores of the lake below the flow line as established and as referred to above.

2. No privy, privy vault, pit, cesspool or other receptacle of any kind or place for the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain at a less distance than 100 feet from the flow line of the lake as established and referred to above, or from any watercourse leading into the lake.

3. Every privy, privy vault, pit, cesspool or other receptacle of any kind or place used for the temporary storage of human excreta which is constructed, placed, maintained or allowed to remain within the said distance of 100 feet from which privy or other receptacle the excreta are not at once removed automatically through suitable water-tight pipes or conduits to some proper place of ultimate disposal as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable movable receptacles which shall at all times be maintained in an absolutely watertight condition and which will permit of convenient removal to some suitable place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid permissible temporary receptacles shall be removed and the receptacles thoroughly cleansed and deodorized as often as may be found necessary to maintain the privy in a proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floors of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape in being transferred from the privy to the place of disposal hereinafter specified and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to the occupants of the premises and of adjacent premises.

5. Unless otherwise specifically ordered or permitted in writing by the State Commissioner of Health the excreta collected in the aforesaid receptacles shall, when removed, be disposed of by burying in trenches or by thoroughly digging into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at distances from the lake or from any watercourses of not less than 200 feet.

6. Whenever it shall be found that, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of subsoil or surface water, or owing to other special local conditions, the excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the surface or through the soil in an imperfectly purified condition into the lake or any watercourse, then the said privy or receptacle for excreta or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

7. No house slops, bath water, sewage or excremental matter from any water-closet, privy or cesspool, shall be thrown, placed, led, conducted, or discharged or allowed to escape or flow from any pipe, drain or ditch, into the lake or into any watercourse, nor shall any such matter be thrown, placed, led, conducted or discharged or allowed to escape or flow onto the surface of the ground or into the ground below the surface within a distance from the flow line of the lake as referred to above, or from any watercourse, of 150 feet.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind, shall be thrown or discharged directly or indirectly into the lake or any watercourse; nor shall any such matter be thrown, discharged, or allowed to escape or remain upon the surface of the ground or to percolate on to or through the ground below

the surface in any manner whereby the same may flow into the lake or into any watercourse at any distance from the flow line of the lake as referred to above, or any watercourse less than fifty feet.

9. No clothing, bedding, carpets, harness, vehicle, receptacle, utensil, nor anything that in any way or to any degree pollutes the water shall be washed, rinsed or placed in the lake or in any watercourse.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe, swim, wade or stand in the waters of Otisco lake or any of its tributaries within a distance of two (2) miles of the intake of the Syracuse Suburban Water Company; nor shall any cattle, poultry, swine or any other animals be allowed to stand, wade, swim or be washed in the waters of Otisco lake or any of its tributaries within a distance of two (2) miles of the intake of the Syracuse Suburban Water Company.

11. No stable for cattle or horses, barnyard, hogpen, poultry-house or yard, hitching post or standing place for horses or other animals, manure pile nor compost heap shall be constructed, placed, maintained or allowed to remain within a distance of twenty-five feet from the flow line of the lake or any water course as referred to above or from any water course leading into the same. And none of the above named objects or sources of pollution shall be constructed, placed or maintained or allowed to remain where, or in such manner that the drainage, leachings or washings therefrom may enter the lake or any water course without having first been passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than twenty-five feet.

12. No human excreta or compost containing the same shall be thrown, placed or discharged, or allowed to escape or to pass into the lake or any water course, nor to be placed, piled or spread upon the ground, or buried, or dug into the soil, below the flow line of the lake or the immediate bank of any water course leading into the same. No manure or compost of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the lake or any water course, nor to be placed, piled or spread upon the ground, or buried, or dug into the soil, within a distance of 200 feet.

13. No decayed or fermented fruit or vegetables, cider mill waste, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged, or allowed to escape or to pass into the lake or any water course, nor shall be thrown, placed, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow into the lake or any water course, nor may any such material or the drainage, leachings, or washings thereof percolate through the ground to the lake or any water course, without first having passed over or through such an extent of soil as to have become properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainage, leachings, or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for distances of at least twenty-five feet.

Dead Animals, Offal, Manufacturing Waste, Etc.

14. No dead bird, animal, fish, nor any part thereof, nor any offal nor refuse from any slaughter-house, nor any decomposed or putrescible refuse or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or to pass into the lake or any water course, nor shall any such material or refuse be so placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach the lake or any water course without having first percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for the distance of twenty-five feet.

Refuse From Boats

15. No excreta, garbage, slops nor any decomposed or purtrescible matter of any kind shall be thrown, discharged or allowed to escape or to pass into the lake or any water course from any steamer, barge, launch, sailboat or rowboat. Steamers, barges and other boats having watercloset or toilet accommodation shall be provided with removable, water-tight receptacles, which shall be regularly emptied, cleaned and deodorized at least once each day, under the same restrictions as those which are imposed by rules 4, 5, 6.

Inspections

16. The Syracuse Suburban Water Company shall maintain systematic and thorough inspections of the lake, boats used on or navigating the same, the lake shores and the entire drainage area of the lake, for the purpose of determining whether the above-mentioned rules are complied with. At least two such inspections shall be made each year, and such others as may be directed by the State Commissioner of Health, or as may be deemed necessary by the Syracuse Suburban Water Company to insure the maintenance of the watershed in a safe. sanitary condition, and a full and detailed report of each such inspection, including a statement of each violation or noncompliance with the rules, shall be submitted in writing to the State Commissioner of Health, within ten days after the completion of such inspection.

Penalty

17. In accordance with section 70 of chapter 45 of the Consolidated Laws (the Public Health Law), the penalty for each and every violation of, or noncompliance with, any of the above rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred dollars ($100).

The foregoing rules and regulations for the protection from contamination of the water supply furnished by the Syracuse Suburban Water Company were duly made, ordained and established on the 14th day of January, 1910, pursuant to chapter 45 of the Consolidated Laws (the Public Health Law) of the State of New York.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Onondaga county and in at least one newspaper in Cortland county, and the affidavit of the printer, publisher or proprietor of each newspaper in each county in which such publication was made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each publication, affidavit and filing must be paid by the Syracuse Suburban Water Company.

INSPECTION OF VIOLATIONS OF RULES FOR THE PROTECTION OF PUBLIC WATER SUPPLIES

During the past year inspections were made by the Department of violations of rules for the protection of public water supplies of Auburn, Kingston, Mt. Vernon, New Rochelle, New York City, Saugerties, Utica and Yonkers.

In some cases a number of inspections were made, a great many violations were examined into by the Engineering Division and the necessary orders issued to the local boards of health. In the case of Auburn 5 inspections were made, 133 violations were examined into and reported upon and 10 orders were issued to the proper local boards of health. In connection with the Kingston water supply 2 inspections were made, 60 violations examined into and 2 orders were issued. In the case of New York City 16 inspections were made, 89 violations examined into and 56 orders were issued. In the case of the Yonkers water supply 91 cases of violations were examined into and reported upon.

During the year orders were issued to three railroad companies requiring the closing of toilets on trains while passing over watersheds protected by rules and regulations. On June 30, 1910, an order was issued to the Lehigh Valley Railroad Company to lock toilets on trains while passing over the watershed of Owasco lake from which the Auburn water supply is derived. The order covered a distance of ten miles reaching from one mile south of Cascade to two miles north of Wyckhoff. On November 11, 1910, at the suggestion of Mr. Edward Hatch, Jr., orders were issued to the New York Central and Hudson River Railroad Company and to the New York, New Haven and Hartford Railroad Company requiring the closing of toilets on trains while passing over the watershed of the Croton river from which the New York City water supply is derived. On the former road, four sections aggregating 67 miles in length were affected and on the latter road a section fifteen miles in length was covered by the order.

INVESTIGATION OF SANITARY CONDITIONS ON WATERSHEDS PROTECTED BY RULES

Attention was called in my last report to the lack of clear understanding on the part of many water boards and companies as to the methods of procedure to follow in removing violations under these rules and regulations, and to the responsibility both legally and financially in causing these rules to be rigidly complied with. It was also pointed out that, owing to these responsibilities and especially the burden of expense entailed by the enforcement of rules, there appeared to be some hesitation on the part of many municipalities and water companies in enforcing the rules and regulations, and, further, a reluctance on the part of many municipalities where their supplies were not protected by rules but the sanitary quality of which was unquestionably subject to suspicion to apply for enactment of these rules.

Realizing this hesitancy on the part of local authorities to meet their full responsibility in this matter, and with a purpose of counteracting to some degree at least this undesirable, and at times dangerous, consequence, a special investigation was made of the watersheds of a considerable number of public supplies which were protected by rules and regulations. These inspections proved clearly that the fears entertained regarding the enforcement of rules and regulations were in a measure well founded; for in a number of cases violations were found to exist on the watershed and in a few cases the conditions revealed a shocking disregard of the moral and legal responsibility which undoubtedly rests upon water boards and water companies.

The municipalities, the watersheds of which were inspected during this investigation, are as follows:

Avon and Geneseo	Cold Spring	Dolgeville
Canastota	Corinth	Elmira (State Reformatory)
Chester	Cornwall-on-Hudson	
Cobleskill	Coxsackie	Elmira

Fredonia	Newburgh	Rome
Ilion	Norwich	Sherburne
Little Falls	Nyack	Tarrytown
Livonia	Oneonta	Troy
Mechanicville	Ossining	West Point
Monticello	Penn Yan	Walton
Middletown	Pleasantville	Waverly
Middleville	Port Jervis	

Following these inspections communications were addressed to the different water commissioners and water companies detailing the violations disclosed by the special investigations. At the close of the year arrangements were being made with those municipalities which had not reported the removal of the violations to follow out the provisions of the Public Health Law which provides for the enforcement of this law.

It is not to be inferred that any considerable number of water boards and companies are delinquent in maintaining a proper sanitary patrol over the watersheds of their supplies. On the contrary, the water supplies of this State which are protected by rules are mostly very carefully and conscientiously patrolled and the boards and companies are very prompt in reporting any violations of these rules and regulations to the State Department of Health, as required of them by law. These cases are always promptly inspected for verification following which the customary notices are issued and action by the State or local authorities in accordance with the procedure required by these rules is taken.

SPECIAL INVESTIGATIONS OF PUBLIC WATER SUPPLIES

By far the larger proportion of public water supplies in the State are not protected by rules and regulations enacted by the State Department of Health. Many of these are, however, very efficiently patrolled, but at the same time it has been found that a considerable number of them receive practically no regular or even occasional inspection for the purpose of ascertaining and removing sources of pollution.

There may be a number of reasons to account for the relatively few public water supplies in the State that are protected by water rules and undoubtedly the question of expense of abatement is, as pointed out above, a very important, if not the principal one. At any rate it has been found that the number of such supplies improperly patrolled is a serious question, one which might well deserve the consideration of some change in the laws relating to the control of waters of the State used for water supply. In order, however, that the dangerous conditions which do exist in connection with many of them may be brought more forcibly to the attention of the local authorities responsible, as well as to the people themselves, the special investigation of these unprotected supplies, begun in 1908 and extended during 1909, was continued during the present year.

It is noteworthy to find that many more applications were made by municipalities in the State for these examinations and reports during 1910 than in either of the two preceding years, which can only be accounted for by a more general knowledge throughout the State of the activities and successful results accomplished by the Department through these investigations in improving the condition of many supplies not protected by rules. A list of the municipalities where such investigations were made during 1910, and where reports setting forth the findings and recommendations were duly transmitted to the local authorities, is as follows:

East Worcester	Lyons	Rouses Point
Fonda	North Tarrytown	Seneca Falls
Glens Falls	Oxford	Sonyea
Kingston	Round Lake	Whitehall

These reports are herewith presented.

EAST WORCESTER

On July 4, 1910, a letter was received from Dr. D. H. Davis, health officer, stating that the water from the public water supply was subject to disagreeable tastes and odors, and requesting that one of the engineers from this Department be sent to look into the matter. This investigation was made on August 18, 1910, and the report thereon was as follows:

ALBANY, N. Y., *September* 23, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation, made in accordance with your directions and in compliance with the request of D. H. Davis, M.D., health officer of East Worcester, of the sanitary condition of the watershed supplying the water used by the village of East Worcester.

The water works are owned by the East Worcester Water Company. Mr. J. Terpening, of Jefferson, N. Y., is president, and Mr. A. Hallenbeck, of East Worcester, is secretary. The water works were designed and constructed by Mr. E. W. Moxley about the year 1898. Since then very little alterations or additions have been made. The water works consist essentially of an intake, a strainer, about 3 miles of mains ranging from 8" to 4" and 80 service taps. The water is supplied by gravity at a pressure from 90 to 100 pounds. The population of East Worcester is about 600 and about 55 per cent. of these are served by the water company. The daily draft is from 150,000 to 200,000 gallons, but about 75 per cent. of this is used by the Delaware and Hudson railroad to feed the boilers of their locomotives.

The results of the analysis of a sample of water collected on July 22d, during the course of the routine work of the State Hygienic Laboratory, are shown on table following page 589. The chemical analysis showed the water to be rich in nitrogenous organic matter.

A request was made by the local authorities for a field investigation, and on August 18th Mr. Fritz M. Arnolt, inspecting engineer with this division, accompanied by D. H. Davis, M.D., health officer of East Worcester, and A. Hallenbeck, secretary of the water company, on part of the investigation, and by Mr. J. Terpening, president of the company, on the entire investigation, examined the watershed and reported on the conditions existing there.

The water supply for East Worcester is derived from Bear Swamp brook. It has a catchment area above the intake of 9.65 square miles. This is located north of the village and consists primarily of pasture land, cultivated land and swamps with small areas of woodland. The main branch of the Bear Swamp brook rises in the Dailey Bear swamp which is located about 4½ miles in a straight line, north of East Worcester. This swamp contains about 85 acres, 65 of which are now covered with water, and the rest is a cranberry marsh. Within a few feet of the upper end of this swamp is the divide between the Susquehanna and Schoharie watersheds. An earthen dam has been constructed by the Great Bear Light and Power Company to impound the water in this swamp, forming a shallow storage reservoir of 65 acres in area and from 6 to 10 feet deep. In dry season this is drawn upon to augment the flow of Bear Swamp brook upon which the Electric Light Company depends primarily for its power. This pond is studded with stumps,

most of which are black ash. It has large growths of algae and pond weeds besides the 18 acres of Cranberry marsh mentioned. This water was highly colored and had a distinctly oily or fishy taste.

Coming from this pond the water flows through rich pasture land for about two miles until it empties into Ferris pond. Cows pasturing on this land had free access to the brook. On the day of the inspection about fifty were seen in this section between Ferris pond and the Dailey Bear Swamp pond. A privy belonging to Charles Rury of Gothicville is located on a watercourse leading to the brook. This is on top of a steep bank, forming one shore of the brook and is open at the back. Although, at the time of the inspection, no water was in this course, it was stated by the electrician of the Great Bear Light and Power Company and by Mr. Terpening that this brook generally had considerable water and only ran dry in extended periods of drought such as the present one. Any rain would wash fecal matter into this course whence it would find its way directly into Bear Swamp brook, a quarter of a mile below.

Ferris pond is a shallow pond about a quarter of a mile long and 200 feet wide. It has a rather soft bottom and contains considerable growths of algae and pond weed. On the west side is pasture land, and on the east side wood land. Cattle have free access to this pond, and five cows were counted standing in the pond. For two miles below Ferris pond the stream flows southward and at no place receives any noticeable human pollution. But during most of this stretch it is exposed to pollution from pasture lands and receives the wash from the road running along side of it. About one-half a mile above the intake it is joined by the east branch of the Bear Swamp brook.

The east branch rises about 2½ miles above the intake in the Ritton Bear swamp. A dam has been thrown up at the mouth of this swamp by the Electric Lighting Company, inundating about 42 acres of land. This pond is from 4 to 12 feet deep. It contains a great number of stumps and large algae and pond weed growths. The water coming from this pond flows southward and slightly to the west until it joins the main branch of Bear Swamp brook about half a mile above the intake. Several small ponds have been formed in the east branch for power purposes. Most of these are not used for power at present, the mills formerly on these ponds being closed up or torn down. One of these ponds is used as a swimming pool. This branch receives surface wash from the adjacent pasture lands and cattle have free access to it. The Dailey Bear Swamp pond, the Ritton Swamp pond, Ferris pond, and the rights to the stream are controlled by the Great Bear Light and Power Company of East Worcester. The East Worcester Water Company has the privilege of taking what water it needs from the stream.

The intake is located about half a mile above the center of the village. It consists of a covered stone drain leading water from the creek into a side channel and an auxiliary opening or pipe leading into the side channel to provide a larger flow, if necessary. The covered drain is about 10"x10" and made of flat stones, not cemented. It leads diagonally across the bed of the stream and is covered with a few inches of very coarse gravel or broken rock. The water enters through the cracks and openings on top and is led into the side channel. The auxiliary channel consists of an opening about the same size as the other, leading from the brook directly into the side channel. This supplies the major quantity of water entering this channel. About 50 feet from the intake is a so-called filter which is really nothing more than a crude strainer. It consists of a gravel bed from 12" to 15" thick, 25 feet long and about 10 feet wide. This is located in the side channel. The water flows over it. Some of the water percolates through the gravel which is from ¼" to 1" in diameter and is led by 6 lines of open-jointed tile pipes into a collecting box. This box is about 4½ feet by 6 feet and contains 3 feet of water. A 6" main leads from this box. The end of the main is covered with a copper mesh of about ⅛" size. The main is laid underneath the water in the side channel, through the storage pond below, through a valve house and into the village. The greater quantity of water passes over the strainer and into the small storage pond below.

The valve house is so arranged that when the supply is greater than the demand the water rises through an open valve into the well at the valve house and flows into the storage pond. If for any reason sufficient water could not be obtained from the intake above a second valve could be opened allowing water from this pond to enter the main. The president of the water company stated that this was, however, never resorted to as sufficient water could always be obtained from above.

A few hundred yards below the valve house a spring supply is led into the main. This supply comes from three covered springs on the hillside. It is led into a manhole or concrete well and from there into the main. The springs were below ground and covered and could not be located by inspection of the surface, but at the time of the investigation a stream of water only as big as one's small finger was flowing into the well, and this supply is practically a negligible factor.

In summary the following points may be emphasized:

1. The ponds and streams from which the supply is drawn are controlled by the Great Bear Light and Power Company and not by the water company.

2. The ponds at the same source contain a great amount of dead wood, algae, pond weed growths and miscroscopic life, and are in the main responsible for the tastes and odors in the water.

4. One privy, that belonging to Charles Rury at Gothicville, is so located on a tributary of the stream as to constitute a serious menace.

5. The purification apparatus is extremely crude and the efficiency must be very slight.

6. Only about 25 per cent. of the present supply is used by the village and the remainder by the Delaware & Hudson Company.

The village of East Worcester is confronted with a problem in water supply which is beginning to assume serious aspects for many of our small towns. The ponds or impounded swamps at the upper end of the catchment area are entirely detrimental to the water supply for drinking purposes but are essential to the storage of water for power necessary to drive the plant of the Great Bear Light and Power Company, which has the premier rights. The stream receives pollution from the adjoining farms during its entire course, and this pollution it would be impracticable to prevent. The microscopic organisms present in the water to which the odors and tastes are due can only be removed by thorough filtration and aeration. The question of two supplies, one for the village and one for the Delaware & Hudson Company, is one of economy.

In conclusion I would, therefore, say that the present supply from an esthetic standpoint, owing to extensive swamps and the deterioration of the supply due to the organic matter from these sources, is unfit for use, and owing to the pollution upon the watershed as shown by the inspection and confirmed by the laboratory analyses, unsafe to use generally without purification, and I would, therefore, recommend that the East Worcester Water Company be advised:

1. That measures should be taken at once to remove from its present location and replaced in such position and under such management as will prevent any contamination from this source.

2. That a more complete inspection be made of the watershed to determine all sources of pollution or contamination and that measures be taken to prevent any possibility of their entering the water supply.

3. That if any difficulties are encountered in removing this pollution that they apply to the State Department of Health for the enactment of rules and regulations for the protection of the watershed which will afford by means of condemnation or purchase means and procedure by which any violations of such rules can be abated.

4. That steps be taken to improve the esthetic quality of the waters by drainage of swamps and removal of organic matters from reservoirs, or by corrective measures such as sand filtration and aeration.

I would further recommend that a copy of this report be transmitted to the local board of health and that they be advised to take the matter up with the water company with a view of having the improvements carried out as above suggested.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

FONDA

ALBANY, N. Y., *December* 6, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to make the following report of an investigation in the matter of the public water supply of the village of Fonda.

Fonda is an incorporated village in Montgomery county, located on the left bank of the Mohawk river, forty-four miles west of the city of Albany. The population of the village is estimated at 1,200.

The public water supply is obtained partly from springs and partly from a stream known as Briggs Run. One group of these springs is located one and one-half miles west of the village, the water issuing from the foot of a knoll composed of sand, locally known as the "Sand Flats." The water from these springs is collected by channels into an adjacent reservoir called the lower reservoir, or Reservoir No. 1. Water from the second group of springs and from the stream called Briggs Run is collected into the upper reservoir, or Reservoir No. 2, located on the stream four and one-half miles west of the village. Approximately half of the supply comes from these springs and one-half from the creek, the lower reservoir being in the nature of a reserve and emergency supply, and is ordinarily shut off from the system.

From the upper reservoir at an elevation of approximately 530 feet above sea level, water flows by gravity through a castiron pipe to a point near the lower reservoir, where it passes through pressure-reducing valves and joins the outlet pipe from the lower reservoir. This pipe delivers water directly to the distributing system in the village. Stop valves are so arranged on the pipe lines from each reservoir that the lower reservoir can be used in case of emergency and at certain times to allow of the cleaning of the upper reservoir. The elevation of the lower reservoir is approximately 400 feet above sea level and about 100 feet above the ground at the railroad station in the village.

The lower reservoir is about 150 feet long and averages about 50 feet in width. The average depth is estimated at 6 feet. The upper reservoir is about 350 feet long and averages about 75 feet in width. Its average depth is 7 feet.

The watershed of Briggs Run above the upper reservoir is approximately two square miles in area. The stream rises about a mile and one-half west of the upper reservoir, in which distance it flows through a deep, rocky valley, a considerable portion of which is forested.

Water is delivered to the village distributing system at a pressure of about 85 lbs. per square inch. There are about six miles of castiron water mains in the village, ranging from 4" to 6" in diameter. The number of service taps is about 270, one of these being metered. Practically all of the 1,200 inhabitants of the village are connected with the public water supply. No figures were directly available as to the water consumption of the village. The water works are owned by the village, and are under the direction of the village board of trustees, constituting the board of water commissioners. Mr. Edgar Leonhardt is president of the board, and the superintendent of water works is Mr. C. B. Clute.

An inspection of the water works of Fonda was made on December 1, 1910, by Mr. A. O. True, assistant engineer of this Department. The assistant engineer was accompanied by Mr. C. B. Clute, superintendent of water works. Both reservoirs were inspected, the springs supplying these, the intake from

the creek at the upper reservoir, and the headwaters of the creek where it is claimed the greater part of the pollution of the creek supply takes place.

Although, in general, good sanitary conditions were found at the reservoirs and in the vicinity of the springs and on the greater part of the watershed of the stream above the intake, several sources of pollution were found at the headwaters of the stream. At this point are several dwellings, a small cheese factory, barns and animal enclosures in proximity to the stream. Considerable contamination of the stream must naturally result from these structures, the drainage from which is directly tributary to the stream. The cheese factory, which is not operating at this season, maintains a whey tub on the edge of the stream, part of the contents of which because of inadequate capacity or carelessness is spilled over into the stream. Adjacent to the factory and directly over the stream is a urinal, said to be in frequent use during those months the factory is open.

Below the factory are fields and pastures bordering the stream; and there is always the opportunity for contamination from the drainage from the manure used as fertilizer, and the cattle which have access to the stream.

In the table following page 589 are given the results of a number of chemical and bacteriological analyses of samples of water collected by the local health officer from various parts of the water works during the present year.

These results indicate a hard water, which is normal for this locality where the underlying rock is of shale, schist and limestone. The organic content of all the samples was very moderate in amount. With one exception all samples showed a high bacterial content and B. Coli was generally present, and in two samples was isolated in as small quantities as 1 c.c. of the water.

The persistent presence of comparatively large numbers of the B. Coli type of organism in a water supply usually indicates contamination of the water from organic matter of animal origin. The colon bacillus is frequently found in small numbers in normal or unpolluted waters, and even when found in quantity, its sanitary significance is not always clear. Its presence in large numbers is suspicious of sewage pollution, though a sanitary survey may show that it is due to other sources which while being objectionable are less dangerous than house sewage. It is very important, then, in interpreting such analyses to take cognizance of all the factors bearing on the chemical and physical quality of the water, as shown by analysis, and the effect which the surroundings of the stream would be expected to have on these qualities.

The samples of this water supply analyzed this year show comparatively small amounts of organic matter, which is consistent with what would be expected from a sparcely settled watershed. The number of bacteria was high, and probably due to the contamination of the water by organic matter from the various sources discussed above. Such results could be caused by barnyard or house drainage or surface wash having become contaminated by the contents of privies located too near the stream.

The large quantity of the colon bacillus type of organisms indicated by the analyses are evidence of pollution from animal sources. They are not inconsistent with conditions as found to exist on the upper watershed where barnyard drainage, whey and the pollution incident to the wallowing of cattle in the stream reach the water supply.

Summarizing from the results of the analyses made by the State laboratory and the inspection made by this division, I beg to submit the following conclusions:

1. That the public water supply of the village of Fonda, while normally, with the exception of its hardness, is of good quality, is subject to a considerable amount of pollution from animal sources.

2. That although much of this pollution appears to be from sources other than those associated with the sewage and other wastes of human origin, nevertheless the opportunity and danger of such pollution exists at the dwellings and other buildings in the upper part of the watershed.

3. That the correction of the dangerous conditions noted could probably be undertaken without great expense by the village.

Finally, I recommend that should the board of water commissioners experience any difficulty in abating insanitary conditions or otherwise find it

impracticable to protect their watershed, they should consider the question of application to this Department for the enactment of rules and regulations in accordance with the provisions of sections 70 and 71 of the Public Health Law.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

GLENS FALLS

At the request of the board of water commissioners of the city, under date of March 21st, a special investigation of the public water supply was made and the following report thereon transmitted to the local board of health and board of water commissioners.

ALBANY, N. Y., *May* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation in the matter of the public water supply of the city of Glens Falls.

Glens Falls is a city in Warren county, located on the left bank of the Hudson river, sixty miles north of Albany; is on the Glens Falls branch of the Delaware & Hudson railroad, and part of the town is on the divide between the watersheds of the Hudson river and Lake Champlain. The population of the city, according to the recent census, is conservatively placed at 18,000 people.

The water supply is obtained from catchment areas on Luzerne mountain, situated about six miles northwest of the city. The water collected from these areas is impounded in storage reservoirs which are supplied by mountain streams, numerous springs and the natural runoff from rainfall and snow. From the intakes situated on the streams and below the reservoirs the water is led by gravity to a junction point from whence it flows, also by gravity in two mains to the city. The works are owned by the city and are under the direction of a board of water commissioners, Mr. S. D. Kendrick (by virtue of his office as mayor), president. Mr. Howard M. West is superintendent of water works.

The collecting area is divided naturally into three main watersheds, the two most northerly of which are tributary to Halfway creek, finding their outlets in Lake Champlain and the St. Lawrence; and the third is tributary to the Hudson river at a point a few miles above Glens Falls. The main streams run in a general southeasterly direction. Their courses are rocky and steep, and they exhibit all the characteristics of a typical mountain brook. The greater part of the collecting area lies in the township of Queensbury, but a small part lies partly in the townships of Caldwell and Luzerne. These collecting areas are, for the most part, upland and wooded. Many of the slopes are precipitous, and only about 20 per cent. of the area is used for agricultural purposes. The soil, even on the higher and steeper parts of the mountain, appears to be rich and of fair depth, yet in the lower parts toward the plain it becomes sandy in character and exhibits a considerable quantity of loose stones.

The first water works were built in 1872 and consisted of a small reservoir and intake formed by a dam built across the junction of two streams. This is known as the Wilkie intake, and the area flooded is about 9/10 of an acre. This supplied the needs of the village for a few years, the water being delivered to the city by gravity through a 12-inch cement-lined pipe.

In 1875 a new intake and masonry intake basin was built on a watershed to the south of the Wilkie works. This intake, known as the Keenan, was connected by a 24-inch castiron pipe with the original system at a point now called the "upper junction."

In 1878 a storage reservoir was built on the Wilkie watershed and near the headwaters of one branch of the stream some two miles above the intake.

This reservoir, known as the Wilkie storage reservoir, has an area of about eighteen acres, a capacity of 55,000,000 gallons and an average depth of ten feet.

In 1892 the Kennan storage reservoir was constructed by damming and flooding about sixty acres near the headwaters of the stream. This has a capacity estimated from 200,000,000 to 225,000,000 gallons. Its average depth is about twelve feet.

In 1905 the city sought an additional supply and built the Butler intake on a stream from Butler pond. This is a small basin of masonry about 0.16 of an acre in area. The Butler storage reservoir was constructed in 1909 by Mr. H. M. West. It is located several hundred feet above the Butler intake and was formed by building an earthen dam with concrete corewall some sixty feet high. Near the center of the dam is a concrete spillway about twenty feet wide and adjoining a concrete valve chamber. Water can be drawn at four different levels, and discharges into the stream under the dam. This reservoir has a natural contour, but was stripped and cleaned before filling. The capacity is 130,000,000 gallons, area of water surface approximately fourteen acres and the depth averages about thirty-three feet.

The pipes from all three intakes are converged and connected at the upper junction. From the upper junction a 12" cement-lined main and a 20" cast-iron main run to the "lower junction." From this point 16" and 12" cast-iron pipes deliver the water to the city distributing system at two points.

The distributing system comprises about thirty-five miles of mains from 4" to 10" in diameter. The average pressure is about eighty-five pounds per square inch. The system is a gravity one throughout and only in case of emergency would temporary pumping be resorted to.

Glens Falls has a population according to the recent census of about 18,000, of which more than 90 per cent. are connected with the public water supply. There are 3.300 service taps, but nine of which are metered. The average daily consumption is about 1,700,000 gallons, of which approximately 70 per cent. represents domestic use, 25 per cent. commercial use and 5 per cent. public use.

An inspection of the Glens Falls watershed was made on May 13 and 14, 1910, by Mr. A. O. True, assistant engineer of this Department. The total population on the watershed is only twelve persons, occupying four farmhouses. With the possible exception of the two cases noted below, no nuisances or insanitary conditions which could be considered dangerous to health were found:

> William Stewart farm on Butler watershed maintains watering trough in brook in winter for cattle, said to have caused accumulation of manure.
>
> Cattle belonging to Andrew Stewart and William Stewart are pastured along the brook in which they are free to walk and drink.

Samples of the water for sanitary analysis were collected at the three intakes and at a tap in the city, and sent to the State Hygienic Laboratory. The results of this analysis in parts per million are given in the table following page 589.

Though the results of the bacteriological analysis of the sample from the Wilkie intake show a total bacterial content, according to standard methods of 170 per c. c., they are consistent with what would be expected in a water of this type. Positive results for B. coli were obtained in two out of three of the 10 c. c. samples, and negative results in all of the 1 c. c. and 1/10 c. c. samples. These results are consistent with the conditions found in the sanitary inspection of the watershed. The occurrence of occasional positive results for B. coli in large samples of water from a watershed known to be in good sanitary condition cannot be taken as evidence of the unsatisfactory sanitary quality of the supply.

The chemical analyses of samples from the Keenan intake are characteristic of a normal surface water of this locality. The bacterial content is not abnormal and the absence of positive tests for B. coli is consistent with conditions existing on the watershed.

The chemical analyses of the samples collected from the Butler intake show a greater organic content than the other sources. This is indicated in the

higher color, albuminoid ammonia and oxygen consumed. The bacteriological results, however, are satisfactory, and an inspection of these analyses together with a knowledge of physical conditions on the watershed indicate that the water from the Butler reservoir is of good sanitary quality. The high organic content is undoubtedly due to the coloring extracted from natural organic substances on the watershed, and is not, at least to any appreciable extent, traceable to pollution from dwellings.

The analysis of the sample from the distributing system is, in view of the condition revealed by the sanitary inspection, satisfactory, and consistent with opinion that the city is at the present time and from the present works being supplied with a water of good sanitary quality.

In conclusion, I beg to recommend that the board of water commissioners make regular sanitary inspection of the total watershed and that they require that that part of the brook running through pasture land be kept free of accumulations of manure.

While there appears to be no direct source of pollution from any of the houses on the watershed, it is well to remember that there are two houses which might, from their positions and proximity to the brook, become sources of pollution in the event of considerable surface wash. The apparent policy of the water commissioner in acquiring by purchase those places which might become sources of pollution is commendable, and in accordance with the practice of town authorities desiring to positively eliminate such conditions.

Should, however, the board of water commissioners experience any difficulty in abating insanitary conditions or otherwise find it impracticable to thus protect their watershed, they should consider the question of application to this Department for the enactment of rules and regulations in accordance with the provisions of sections 70 and 71 of the Public Health Law.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

KINGSTON

ALBANY, N. Y., *July* 20, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your direction I beg to submit the following report of an investigation of the public water supply of the city of Kingston.

This investigation was made at the request of the board of water commissioners of the city of Kingston and was conducted by C. F. Breitzke, assistant engineer. The inspection of the watershed required two days, April 15 and April 20, 1910. On the former date our engineer was accompanied by President Wm. R. Harrison and Messrs. Block, Johnson and Wood of the board of water commissioners, Dr. L. K. Stelle, city health officer, and Mr. John H. Harrison, superintendent of water works; on the latter date by Mayor Roscoe Irvin, Dr. Stelle and Superintendent Harrison. On April 20 representative samples of the water also were taken and sent to the State Hygienic Laboratory for chemical and bacteriological analysis. The report on the findings of the investigation and the discussion of the analysis is presented herewith.

The city of Kingston is located in the eastern part of Ulster county on the west side of the Hudson river, fifty-four miles south of Albany, and is situated between Esopus creek, forming its northwestern boundary, and Rondout creek, bounding it on the southeast. It is a station on the West Shore railroad and is the eastern terminal of the Wallkill Valley railroad and of the Ulster & Delaware railroad.

Kingston has a population of about 27,000, of whom about 90 per cent. obtain their water supply directly from the public water works. The water is obtained from Sawkill creek in the Catskill mountains and after passing

through mechanical filters is furnished to the consumers by the city. Rules and regulations for the protection of this supply were enacted by this Department May 22, 1901.

The original water works were installed in 1883 by the Kingston Water Company. On March 1, 1896, they were taken over by the city, and subsequently have been enlarged until they now consist of four impounding and storage reservoirs on Sawkill creek and its tributaries, designated as Reservoirs Nos. 1, 2, 3, or Cooper lake, and 4, respectively, having a combined capacity of 367,000,000 gallons; of a small diverting dam on Mink Hollow creek, diverting water from that stream through a 12-inch main 1.06 miles long into Cooper lake; of a filter house equipped with twelve New York Continental Jewell mechanical horizontal pressure filters having a capacity of 6,000,000 gallons per twenty-four hours; and of 67.15 miles of mains, ranging from 4-inch to 20-inch in diameter, of which 16.95 miles are outside of the city, and consist of 6.87 miles of 18-inch main from Reservoir No. 1, serving as a low service system supplying that portion of the city below Hasbrouck and Delaware avenues, Broadway and Stuyvesant street, and West Pierpont street and Montrepose avenue, and of 9.02 miles of 20-inch main from Reservoir No. 2, serving as a high service system supplying all of the city above the three points just referred to. The two lines of mains can be connected at any one of four places, viz.: (1) just below Reservoir No. 1; (2) at a point on the north bank of Esopus creek, 2½ miles from Kingston; (3) at a point on the south bank of Esopus creek just opposite (2); and (4) at the corner of Albany and Manor avenues within the city limits, making it possible for the city to obtain its supply from the high or the low service reservoirs, or from either of them for the whole or a part of the city.

There are about 4,725 service taps, of which about 100 are metered. The average daily consumption is about 6,000,000 gallons, of which about 3,800,000 are used for domestic consumption; 200,000 gallons by commercial users, and about 2,000,000 gallons for public purposes. The water is furnished by gravity. In the lower portion of the city the pressure is from 80 to 130 pounds per square inch; in the upper portion from 55 to 105 pounds per square inch.

Reservoir No. 1 is located on the main stream of Sawkill creek, and is part of the original water works, being built in 1883. It has a masonry dam backed by an earth embankment. The intake is a rectangular rubble masonry well, located at the toe of the dam, and having three inlets five feet and fifteen feet from the surface and at the bottom, respectively. The spillway is at an elevation of 351 feet above sea level. The reservoir is uncovered, has an area of nineteen acres and a capacity of 65,000,000 gallons. It has a maximum depth of twenty-five feet and an average depth of about eleven feet.

Reservoir No. 2 is located on the main stream 2½ miles above Reservoir No. 1. It was constructed in 1897 and put into service in the spring of 1898. It has an ashlar masonry dam backed by an earth embankment. The intake chamber is built into the upstream face of the dam and has inlets 3, 13 and 23 feet from the surface, respectively. The elevation of the spillway is 451 feet above tidewater. The reservoir is uncovered, has an area of thirteen acres, and a capacity of 45,000,000 gallons. The maximum depth of the water is twenty-six feet and the average depth is about eleven feet.

Reservoir No. 3, known as Cooper lake, is located about sixteen miles northwest of Kingston, near the head of Lake brook, a small stream tributary to the Sawkill at Shady. It was first used as a source of water supply in the year 1893, when on account of the inadequate storage capacity of the impounding reservoir (Reservoir No. 1) the water company was forced to obtain water from this lake by purchase and made a contract covering similar purchases for a period of seven years. After the water works were taken over by the city in 1896, the water commissioners purchased the property rights of the owners of land adjoining the lake and proceeded to build a new dam five feet higher than the old one, increasing the area of the lake's surface from 65 to 80 acres, and its storage capacity from 50,000,000 to 200,000,000 gallons. The dam is about 100 feet long and 20 feet high. It is constructed of earth with a masonry core wall and has a concrete spillway about 35 feet long and impounding about 15 feet of water. The gatehouse is a circular well and

tower built in the toe of the dam. It has intakes 6 and 11 feet, respectively, below the flow line, and when needed water is passed through a 20-inch outlet pipe and discharged into Lake brook, whence it follows the natural channel of that stream to the Sawkill. The elevation of the lake is about 1,100 feet above tidewater. Its average depth is about seven feet.

In 1900, on account of the great drought prevailing at that time, an auxiliary supply was obtained from Mink Hollow creek by laying a 12-inch pipe 1.06 miles long from Cooper lake to a small intake well and diverting dam on Mink Hollow creek at a point opposite the district school at Lake hill. This supply, however, is used only in time of drought to supplement the water stored in Cooper lake.

Reservoir No. 4 was constructed in 1909 west of Reservoir No. 1, on a number of small streams tributary to the Sawkill on land the location of which is such that in time of freshet the system will be protected from muddy water. This is done by discontinuing the use of water from Reservoir No. 1 and No. 2, which are located on the main stream, which is very roily after a storm, and by using clear water from the new reservoir. The area of this reservoir is 19.5 acres, and it has a capacity of 57,000,000 gallons. The elevation of the flow line is about 380 feet above tidewater. The maximum depth is 24.4 feet and the average depth about ten feet.

The filter plant is located a few hundred yards below Reservoir No. 1. The building is a two story structure 73 feet, 6 inches by 62 feet, 7 inches, constructed of blue stone ashlar work with a concrete floor. The lower part of the building is occupied by twelve horizontal pressure filters, manufactured by the New York Continental Jewell Filtration Company, and guaranteed collectively to deliver 8,000,000 gallons of water daily. Both of the mains referred to above pass through the filter house and connections are so arranged that all or a portion of the filters can be supplied from them. Usually, eight of the filters are connected with the higher pressure and the other filters supply the lower part of the city. On each main is a large Venturi meter, which meters by means of clockwork register at intervals of ten minutes the quantity of filtered water which passes down to the city. On the upper floor of the filter house are ninety-six valves, by means of which all operations of the filters are controlled.

The filters are 8 feet in diameter and 20 feet long. The shells are made of tank steel 9/16ths of an inch in thickness with sheet steel heads 11/16ths of an inch thick, and are capable of withstanding an internal pressure of 200 pounds to the square inch. The filter units are arranged in two rows, six on a side, with the ends about ten feet apart. The water mains from the reservoirs pass through the space between the two rows quite close to the ceiling. These 8-inch pipes convey the water to the top of each filter, whence the water passes through spreader troughs along the sides onto a perforated ⅜-inch steel plate and thence onto the filtering surface. The filtering material consists of 5½ feet of selected silica sand shipped from Bayonne, N. J., and overlying 10 to 11 inches of selected Cape May, N. J., gravel. Beneath the gravel at the bottom of each tank and imbedded in a bed of concrete are 102 cones or strainer tubes about 1½ inches in diameter filled with pea-sized gravel and each connected with ¾-inch brass pipe connecting directly with the piping system, discharging through an 8-inch pipe into the mains leading to the city.

The coagulant is applied by shunting a slow current of raw water through coagulant drums. There are four of these, two for each row of filters, and arranged in series. These drums are of the usual New York filter construction, and are castiron cylinders with bolted tops having a 6-inch hole closed by a cover clamped in place. They are 3 feet high and 2 feet in diameter. The flow of shunted raw water is regulated by valves on inlet and outlet pipes opened a few turns. There are no graduations and no device to give a clue as to the rate the coagulant is applied beyond noting the length of time it takes to use up a charge. The coagulant used is crystallized alum (egg size obtained from the Pennsylvania Salt Manufacturing Company of Philadelphia. Ten pounds are used per charge, and it is estimated by the superintendent of water works that 1/10 to 1/8 grain per gallon are used.

The filters are washed by reversing the flow from the bottom. The inlet

valve and two of the three effluent valves are closed. A valve connecting with a waste water pipe is opened and filtered water is forced backward through the effluent pipe up through a section of the strainers and on through the gravel and sand and out through the waste water pipe. In this manner each section is washed and after the three sections are washed, all three effluent valves are opened and the entire tank is washed. This is continued until the waste water is clear. The washing of a filter usually takes ten minutes.

Under ordinary conditions each filter is cleaned once a day, but when heavy rains have increased the turbidity of the water, the filters are washed two or three times a day. The difficulties due to turbid water, however, have been largely overcome by the construction of Reservoir No. 4, described above, the completion of which has made it possible to use a practically clear water in times of freshet.

Sawkill creek is tributary to Esopus creek at a point about three miles north of Kingston. It has its beginning as an outlet of Echo lake, located in the Catskill mountains in a valley between the Overlook and Indian Head mountains, at an elevation of about 3,000 feet above sea level. The watershed of the stream is about thirty-three square miles in area. It drains the southern slope of the Catskill mountains and is adjacent to the upper part of the Schoharie drainage area on the north, to that of the Plattekill on the east, and to that of the Esopus creek on the west and south. Beginning with Echo lake the main stream flows in a southwesterly direction for about five miles to Shady, thence in a southerly direction for two miles to Bearsville, thence four miles in an easterly direction through Woodstock to Reservoir No. 2, about two miles east of that village, and thence in a southeasterly direction to Reservoir No. 1, and to Esopus creek.

The chief tributaries of Sawkill creek are as follows: Above Shady, a number of streams enter it, draining the southern slopes of Indian Head mountain and Twin mountain. At Shady a stream enters from the northeast draining the northern slopes of the mountains extending from Shady to Meads. Just below Shady a stream known as Lake brook and flowing from Cooper lake enters it from the northwest. The next large tributary drains an area west and northwest of Bearsville and enters just below that village. South of Woodstock two streams draining the southern slopes of the mountains extending from Shady to Meads and which unite at Woodstock, enter. About a fourth of a mile further east a large stream draining the western half of the southern slope of the mountains extending from Meads to Overlook mountain discharges into it. Below Reservoir No. 2 another large stream draining the eastern half of the southern slope of the mountains just referred to enters it from the north. About the last large tributary enters Sawkill creek about a half mile above Reservoir No. 1 and drains a settled area of about 3.5 square miles lying east of Tontah mountain and Glenford and north of West Hurley.

The northern half of the watershed of the stream is characterized by steep and rocky slopes, covered for the most part by a second growth of timber. In the southern half the slopes are not as steep and have been stripped of practically all of their forest and are used for agricultural purposes. The underlying rock is shale and so far as could be learned the watershed is free from limestone. The average declivity of the watershed is high, causing a very rapid drainage of the surface and of the ground. The stream is subject to spring floods of great magnitude. The average rainfall in the mountainous portion of the watershed is about 50 inches. A rainfall record has been kept by the Kingston Water Works officials at Reservoir No. 1 and shows an annual rainfall of 43 inches to 61 inches. Evidence available tends to show a rapid downpour of a large proportion of the total rainfall in sudden showers, a condition unfavorable to soaking into the ground, but causing a rapid runoff. The watershed belongs to the class styled "flashy," the streams rising quickly during heavy rains and discharging their flood waters very rapidly after the storms have passed.

The Mink Hollow stream watershed above the diverting dam is about eight square miles in area, and for the most part its slopes are steep and wooded. The main stream has its source at Mink Hollow between Plateau mountain and Sugar Loaf mountain, and flows in a southerly direction in a very nar-

row valley into Beaver kill. From its source to the diverting dam is a distance of about four miles. About a mile above the intake a large stream draining the southern slopes of Sugar Loaf mountain and the southern slope of Twin mountain enters. The character and topography of the watershed are similar to the north part of Sawkill watershed.

The details of the inspection of the Sawkill creek watershed are given in Appendix I and II:* Appendix I being a report of violations of the rules and regulations enacted for the protection of this supply, made in accordance with the provisions of section 71 of chapter 45 of the Consolidated Laws (Public Health Law) and for which orders were accordingly issued to the local boards of health; and Appendix II being an additional list of violations and dangerous sources of contamination discovered at the time of the inspection, but in the cases of which the procedure prescribed by section 71 had not been followed.

Owing to the size of the watershed and to the roughness and steepness of its slopes, making the work of the inspection slow and difficult, it was impossible for our engineer to make a complete inspection of the watershed. In the two days at his disposal, however, he covered the more thickly settled portions of the watershed, particularly at Cooper lake, Shady, Bearsville, Byrdecliffe, Woodstock, and in the vicinity of Reservations Nos. 1 and 4. During this inspection some sixty places were noted from which it was possible that contamination of the water supply might take place at time of heavy rainfall, some of which, as will be seen from Appendix I and II were a serious menace to the purity of the supply. In a large number of cases privies without vaults were situated close to the streams. Serious conditions were found to exist particularly at Woodstock where houses close together extended along the edge of a branch of the Sawkill for nearly a mile. At Byrdecliffe four cesspools, receiving the sewage from nearly 100 people, are located on a steep and springy side hill. One of these visited was located directly in the path of a stream and an overflow equivalent in volume to the discharge of a 6" pipe was coming from it. The other cesspools were reported to be in a similar condition. At one place just north of Woodstock and close to a stream a case of typhoid fever existed.

The resident population on the watershed is about 1,300 or about 40 per square mile. Most of it is concentrated on the southern half, giving a ratio of 75 to 80 per square mile. The region is a beautiful one and is fast becoming popular as a summer resort, thus introducing an additional menace to the purity of the supply. The construction of the large storage reservoir of the New York city water supply at West Hurley, Brown's Station and Shokan has necessitated a change in the location of the Ulster and Delaware railroad and the new route will pass through Woodstock and Bearsville. A new State road is also to pass through these places, thus making them more accessible to tourists and summer boarders.

Time did not permit the inspection of the watershed of the Mink Hollow stream. From the United States topographical map for this region, however, it appears that there are some fifteen houses above the supplementary intake of the Kingston water works, and all of them are in a steep narrow valley close to the stream. If the conditions on the Sawkill creek watershed hold good here there are evidently a number of privies without vaults close to the stream.

The results in parts per million of a series of analyses of samples of water collected during 1909 from various points of the distributing system, together with the analyses of the samples collected by our engineer at the time of the inspection are given in the table following page 589. The amount of nitrogenous organic matter was rather high in the majority of the samples, and fecal bacteria were found present in quantities of water as small as one-tenth of a cubic centimeter in the sample of the filter effluent collected on April 20, 1910. The analyses of samples of raw water taken near the spillway of Reservoir No. 4 and from Sawkill creek gave a high bacterial count, and confirm the results of the inspection of the watershed in that they indicate that

* The appendices are omitted from this report.

contamination of the water supply is taking place. The low bacterial count in the water applied to the filters shows the efficiency of Reservoir No. 4 as a settling basin. The analyses of the effluent of the filters show a variable and low efficiency, and at the time of the inspection the efficiency of the plant was practically nil. At that time the effluent was found to contain *B. coli* in two out of three of the one-tenth of a cubic centimeter samples.

It is evident, therefore, that immediate steps should be taken to remove not only as far as possible all sources of contamination, but steps should also be taken to operate the filter plant more efficiently. The first can be brought about by a strict enforcement of the rules and regulations enacted by the Department for the protection of this supply; the latter by applying the coagulant scientifically.

The efficiency of a mechanical filter depends upon the proper use of a coagulant. The coagulant generally used is alum or sulphate of aluminum. When this is introduced into the water chemical action takes place, the natural carbonates and bicarbonates of the water acting on the alum, decomposing it and forming aluminum hydrate, a gelatinous mass which entangles bacteria and other suspended matter in the applied water and forms floes which are removed by the sand layer. In the case of very soft waters soda ash is added to prevent the filtered water from becoming acid.

The present method for applying the alum is to place an indefinite bulk of alum in receivers through which a small current of water is shunted and which again enters the applied water before reaching the filter. It requires but little reflection to satisfy oneself that the water thus passing about the large bulk of alum soon after the charge is first placed in the receivers must necessarily be a saturated solution and may be applying more grains per gallon of water than is necessary to produce the precipitation of the organic matter and thus allow alum to remain in the filtered water and pass into the mains. In a like manner when the alum in the receivers has been reduced to a minimum from its constant contact with the shunted current of water, the remaining amount of alum can not give up the necessary amount of grains per gallon to efficiently purify the water. The present method of applying the alum to the water is therefore unreliable.

The method of applying alum which in practice has given best results is one in which a solution of standard strength of alum is mixed, the standard depending upon the amount of organic matter present. This solution is ejected into the applied water in quantity proportional to the amount of water passing through the mains.

The latter application is brought about by different devices by different companies. An example of this method can be found at Hornell, N. Y., where mechanical pressure filters have been installed under conditions similar to those at Kingston. A description of the method is given on page 352 of volume II of the Twenty-ninth Annual Report of this Department for 1908.

> "The coagulant is dissolved in a cypress tank four by six feet at the rear of the filter house; from the dissolving tank the solution is turned into a mixing tank of the same size, where it is diluted to the strength required. From the mixing tank the coagulant solution flows through a lead pipe to a pit at the front end of the filter house to a small 1½" Gould pump operated by the raw water pressure. The pump forces the coagulant into the raw water line. The coagulation takes place in the raw main and in the filter tanks, the period of detention being not over thirty minutes. The rate of application is gauged by the speed of the pump, the amount to be added being determined by the inspection of water taken from the effluent line."

The scientific application of coagulant should be carried on under the supervision of a sanitary chemist who is competent to make analyses of the water from time to time to determine the amount of coagulant to be applied, whether soda ash is required, and the quality of the effluent. This may be done under the direction of a consulting chemist and bacteriologist as at Norwich and Oneonta, both of which places are considerably smaller than Kingston, or by regularly employing a sanitary chemist as at Elmira, a city only slightly larger than Kingston. At Norwich (population, 7,000) a small

laboratory is maintained where tests for the removal of color, turbidity, bacteria and *B. coli*, and for the reduction in alkalinity can be determined by the operator every day working under the instructions of a consulting chemist and bacteriologist. At Oneonta (population, 10,000) a laboratory was installed on the operating floor so that the operators can make the necessary tests to see that the filters are working properly. In this way the plant is always under control. At Elmira (population, 40,000) an extensive laboratory is maintained. Prior to May, 1905, tests were made about five times a year. Commencing with that date daily chemical and bacteriological determinations have been made which have made it possible to keep the plant under control at all times, and the results obtained show better efficiency and more uniform results.

In view of the foregoing, therefore, I recommend that a copy of this report be sent to the board of water commissioners of the city of Kingston, and that they be advised that:

1. A thorough inspection should be made of the entire watershed of Sawkill creek and also of Mink Hollow brook, provided it is intended to continue to use that stream as a source of supplementary supply, and steps taken to enforce the rules and regulations enacted by this Department for the protection of their water supply, to remove as far as possible all existing violations of these rules and sources of contamination of their supply and to guard against their recurrence in the future.

2. The watershed of Sawkill creek is becoming increasingly popular as a summer resort, and an increasingly serious element of danger lies in the pollution from the large number of tourists and summer boarders living in isolated houses and camps. The only effective protection of the water supply that can be secured against such pollution is the *efficient* filtration of the water before it supplies the city.

3. Immediate steps should, therefore, be taken to increase the efficiency of the filter plant by scientifically applying the coagulant to the raw water and by placing the operation of the plant under the supervision of some sanitary expert.

Very respectfully,

THEODORE HORTON,

Chief Engineer

LYONS

At the request of Mrs. E. M. Finigan, secretary and superintendent of the Lyons Water Works Company, made on May 28, 1910, an examination of the public water supply was made and reported upon as follows:

ALBANY, N. Y., *June* 21, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation of the water supply of the village of Lyons, Wayne county. The investigation was requested by local authorities, and on June 16 and 17, 1910, Mr. F. M. Arnolt, inspecting engineer, visited Lyons and made the investigation.

Lyons is an incorporated village in Wayne county, located on Ganargua or Mud cheek, a tributary to the Clyde river, on the New York Central and Hudson River and West Shore railroads.

The village has a population of about 5,000, of which somewhat over half are connected with the public water works. The water is furnished by the Lyons Water Works Company, of which Mr. C. J. Ryan, Jr., is president, and Mrs. E. M. Finigan is secretary and superintendent. No sewer system is installed in the village.

The water works consists of two intake trenches filled with gravel, leading from Mud creek to an open impounding and sedimentation reservoir, a small charcoal filter, a clear water well, 10 driven wells, pump station, standpipe and distributing system. There are 10 miles of 10" to 4" cast-iron pipe, 578 service taps, of which only 380 are in use, and of which 9 are metered.

The pressure on the mains varies from 75 to 80 pounds. The average consumption is about 300,000 gallons per day in summer and about 200,000 gallons per day in winter. The original water works were put into service in 1887.

The water supply is a mixed supply taken from Ganargua creek and a series of driven wells. The geological formation at Lyons is such as to make very difficult the problem of obtaining a satisfactory supply. In this region are found the Niagara and corniferous limestones and the Salina shales. At no place in the neighborhood can wells be driven to yield any considerable supply without striking water that is almost brackish. Many trial wells have been sunk by the Lyons Water Company to obtain a sufficient and satisfactory supply of ground water, but they have all failed. They have, therefore, drawn on Ganargua or Mud creek, and at present over half of the Lyons supply is taken from this source.

The two intake trenches are 6 feet wide and 11 feet deep and are filled with gravel of ½" to 2" size. Cinders have been dumped over the intake end, forming a layer 6 feet deep. The water from Mud creek flows through the trenches and enters the sedimentation reservoir which is from 39 to 44 feet wide and from 70 to 75 feet long. Three 12" wells, 40 feet deep, are sunk in the bottom of the reservoir.

The reservoir was in a very unclean condition, being overgrown with algae and pond weeds. The attendant in charge stated that this growth was so abundant that the reservoir had to be cleaned out at least once a week. The cleaning was done by cutting the weeds with a chain and then scooping out the floating masses with a shallow net. It was stated that no attempt had ever been made to remove the growths in the reservoir by the use of copper sulphate or by the use of any other chemical. No cognizance of the fact seemed to have been taken that the reservoir was an open one, containing a mixture of ground and surface water and, therefore, would invariably cause trouble by growths of algae, pond weeds and microscopical organisms.

The reservoir leads into a rectangular brick well. This is 5 x 12 x 17 feet and covered with plank. It contains 120 bushels of charcoal extending part way into the reservoir. Just beyond this charcoal filter lies a circular clear water well which contains the intake to the pumps. Four 10-inch wells on the north side and three 10-inch wells on the south side of the reservoir lead into the clear water well.

The pumphouse is a brick structure 34 x 28 feet, containing two Davidson No. 12 1,000,000-gallon compound steam pumps, two Davidson No. 2 air pumps and one small Davidson No. 3 boiler-feed pump. The adjoining boiler wing houses two 125 H. P. boilers.

The water is pumped to a standpipe located about half a mile east of the pumphouse on a hill. It is a steel cylindrical structure 50 feet high, 20 feet in diameter, open at the top and is elevated 200 feet.

Ganargua or Mud creek is a slow flowing, highly turbid, yellow colored stream rising in Ontario and Monroe counties. It has a catchment area of 299.2 square miles and discharges into the Clyde river at a rate of 1,900 cubic feet per second. It passes through and receives the pollution of a large number of villages. Swamps extend from a few hundred feet to over a mile on each side of the stream for over ten miles above the Lyons intake. Between Lyons and Newark, Ganargua creek itself receives very little pollution. The farm houses are located away from the stream on flat ground and the danger of pollution from their privies, cesspools or other sources reaching the creek is very slight.

The main pollution of the Lyons supply is caused by the discharge, into Military Run, a feeder to Ganargua creek, of sewage contributed by at least 3,000 people at the village of Newark.

Military Run is a small stream running through the center of Newark and discharging into Ganargua creek about eight miles above the Lyons intake. In the upper reaches of the brook, open and tile drains collect the sewage from about 100 people on West Maple avenue, Madison street and adjacent property and discharge it into Military brook at the rear of Jackson and Perkins's nurseries. The owners of the property through which the original open drains ran, objected to the odor arising from them and advised the vil-

lage authorities of Newark that they would permit the drains to run across the property only on the condition that they were suitably covered. The village of Newark then constructed the tile drains.

The most serious pollution occurs at the west end of the Bartle lumber yards on West Union street. Here a State drain discharges the sewage of about 2,500 people into Military Run. This drain was constructed by the State for the purpose of draining the cellars below the canal level. It runs from East avenue westward on East and West Union street and discharges at the point mentioned. Sewer connections have been made in recent years by all the business houses on East and West Union streets. Laterals have been constructed, one man connecting with the pipe of his neighbor until now half of the village of Newark is connected with this drain.

Just beyond the outlet of the State drain, Military Run crosses under the Erie canal and at the north side of the canal is a pool of septic sewage 15′ x 30′ and from 4′ to 6′ deep, which is constantly bubbling up and giving off foul gases.

Just below the point where Military Run crosses under the canal there is a waste weir on the north bank of the canal. When the traffic is light and the locks below are not used the water in the canal rises and flows over the weir, to some extent flushing and diluting Military Run. The weir gates are raised for a short period at night to flush Military Run.

For a half a mile below this point the stream receives a large amount of pollution. Privies and drains from factories, hotels and houses discharge directly into the stream. At East Sherman street the Reed Manufacturing Company discharges its sewage. In this short stretch below the outlet of the State drain the sewage of at least 300 people is discharged into Military Run.

At the time of the inspection the stream was discolored with sewage, although not as strong as ordinarily, since waste from the canal was diluting it approximately four-fold. This happens only at very irregular intervals. Fecal matter, paper and garbage were seen in large quantities floating down-stream.

The people of Lyons state that for the greater part of the year the water tastes so fishy that it is unfit for use. This is probably due to the immense numbers of microscopical organisms present in the reservoir and in Ganargua creek. Temporary relief could probably be obtained by thoroughly cleaning the reservoir and treating it with copper sulphate. This, however, must only be applied under the direction of an expert in such matters. Covering the reservoir would afford little relief, for while it would tend to check the heavy growth in the reservoir itself it would have no influence on the large numbers of microscopic organisms coming in with the water from Ganargua creek, as this water does not remain in the reservoir more than a few hours.

The health officer, Dr. M. A. Veeder, stated that no epidemics of typhoid have occurred in the village, but that it has had about twenty cases of typhoid fever a year. He attributes most of these to imported cases.

Samples of water were taken at the time of the investigation and at previous periods, the results of their analyses being given in the table following page 589. These results show that the water from Ganargua creek contains a large amount of putrefactive organic matter. The *B. coli* type is found regularly in 1 c.c. samples and the total bacterial count is very high. The results of the analyses confirm the evidence as to the pollution of the supply deduced from the sanitary survey and show that Ganargua creek is a very highly polluted and dangerous supply. It has a very large drainage area and flows through a great number of villages and towns, receiving more or less pollution from each of them. It would be difficult to clean up the watershed so as to make this a safe supply and it would also be inexpedient and expensive at present, for aside from the contaminated condition of the water due to sewage pollution, the stream is unfit for use without proper treatment, on account of the presence of the large numbers of microscopical organisms imparting to it a very disagreeable fishy taste and odor. The water supplied to the village is a mixture of water from Ganargua creek and from wells, in proportion of about 1.1. The analyses of this water show it to be

little, if any, better than the Ganargua creek supply and that it is wholly unfit for use and dangerous to the life and health of the community.

I should, therefore, recommend,

1. That since the sanitary survey has shown that Ganargua creek receives extensive sewage pollution and since the various analyses of the Lyons water supply, made by the State Hygienic Laboratory have always shown the water to be dangerously polluted, the Lyons Water Company be notified that their supply is unfit and unsafe for use.
2. That as a temporary safeguard until a better supply can be obtained, the Lyons Water Company be advised to continue notifying their customers to boil the water before using.
3. That since the field investigation has shown that the watershed of the Lyons supply is in an insanitary condition and that the water is dangerously polluted that the Lyons Water Company be advised to improve their supply or obtain a new and pure supply.

The problem before the Lyons Water Company is a serious one and needs much study. They should secure expert advice as to the advisability of securing a new and wholesome supply or as to the best means of making the present supply a safe and wholesome water.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

NORTH TARRYTOWN

A special investigation of the water supply and the filtration plant was made at the request of the health officer of the village of Hastings-on-Hudson, made to this Department under date of March 16, 1910. The report on this investigation follows.

ALBANY, N. Y., *October* 3, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation in the matter of the public water supply of the villages of North Tarrytown, Hastings-on-Hudson, Dobbs Ferry and Ardsley. and the town of Scarsdale.

These places are all located in Westchester county, 15 to 25 miles north of New York city, and with the exception of the town of Scarsdale, are on the Hudson river, and the main line of the New York Central and Hudson River railroad. Scarsdale is four miles east of Hastings and on the Harlem division of the New York Central and Hudson River railroad.

The aggregate population of these communities which are served from one source of water supply is roughly about 10,000.

The water supply is obtained from the watershed of the Pocantico river at Pocantico lake, located in North Tarrytown, three miles northwest of the village of Tarrytown. The waterworks are owned and operated by the Consolidated Water Company of Suburban New York. This is a surface supply, Pocantico lake being an impounding reservoir and formed by holding back the Pocantico river by means of an earthen dam. From an intake shaft located near this dam the water flows by gravity to a coagulating basin in the form of a steel standpipe located below the dam. The suction lines of the pumps are led from this standpipe. On these suction lines are located the mechanical filters of the "pressure" type used in filtering the supply. The filters, steam pumps, boilers and laboratory are housed in a substantial stone building situated just below the dam. The filtered water is pumped to several reservoirs and standpipes by means of two steam pumps of the reciprocating type. One of these pumps is a Dean compound tandem, duplex, 10" x 30" x 18" x 12", of 2,000,000 gallons per day capacity. The other a Worthington triple expansion, tandem steam pump, 12"x19"x30"x14½"x24",

of 3,000,000 gallons per day capacity. Steam for the pumps is generated in three boilers, two rated at 75 H. P. each, and the third at 125 H. P.

The filters are of the mechanical, pressure type. There are four units, each consisting of a cylindrical steel tank 25 feet long by 8 feet in diameter. The filters are arranged in two batteries of two units each lying with their long dimensions horizontal. Each tank has an 8" inlet and an 8" outlet, and is provided with a manhole. There are no distributing pipes or troughs. Each tank has a strainer system consisting of transverse manifolds and 2½" galvanized pipe laterals tapped for ⅜" brass strainers. Over each strainer system is placed 6" of gravel and above the gravel 3 feet of filter sand. New strainers and new filtering material were placed in the filters on June 25, 1910.

To within a recent date sulphate of alumina as a coagulant has been the only chemical used in operating. During the installation of a new strainer system and new filtering material on June 25, 1910, hypochlorites were used while the filters were by-passed. During a visit to the plant by an engineer of this Department on August 2, 1910, hypochlorites were being applied together with alumina to the influent of the filters.

In the normal operation of the plant the course of the water is as follows: After leaving the intake shaft the water flows by gravity to a coagulating tank 20 feet in diameter and 30 feet high, containing baffles. Before entering this tank the water receives the coagulant solution, prepared in a small building situated nearby and above the hydraulic grade line of the plant. From the coagulating tank the water passes to the suction lines of the pumps. Between the coagulating tank and the pumps are the filter tanks, constituting part of the suction lines of the pumps. After passing through the filters the water is pumped to the various reservoirs and standpipes supplying the several villages. In washing the filters the inlet valve is closed, the overflow valve is opened; and the outlet valve being closed, water under pressure is allowed to flow through the filtering material in the reverse direction. No agitation is used other than that resulting from the reverse flow of water. The total filtering area is approximately 500 square feet. At the average consumption per day of 1,700,000 gallons this would mean an average rate of filtration of about 148,000,000 gallons per acre per day. This is a high rate even for a rapid or mechanical filter.

In the pumproom there is a small laboratory used by the engineer in charge of the pumps to make a few chemical tests of the raw and filtered water. These tests, however, are made under the surveillance of a firm of expert chemists, by whom more complete chemical and bacteriological analyses of the water are made from time to time.

The average daily consumption of water from these works is said to be 1,700,000 gallons per day. Most of the supply is metered. There are 65 miles of mains from 4 inches to 16 inches in diameter. There are 1,800 service taps, which would indicate upwards of 10,000 consumers. Roughly, the average pressure in the mains is 100 pounds per square inch.

On June 25, 1910, an inspection of the filter plant and part of the watershed of the Pocantico river was made by Mr. A. O. True, assistant engineer of this Department. Samples of the raw and filtered water were taken on August 2, 1910, and analyzed at the State Hygienic Laboratory. The results of these analyses together with other results of the analysis of the Pocantico river are given in parts per million in the table following page 589.

The results indicate considerable pollution of the Pocantico river above the reservoir. The raw water at the intake well was of better quality than in the river or its tributaries, indicating the removal of organic matter and bacteria effected by the reservoir. However, the bacterial count of 2,300 was not low for an impounded surface water. The stream coming from St. Joseph's college is undoubtedly polluted, as is evidenced by the high bacterial count and the presence of *B. coli* in all dilutions. The analyses of the filtered water indicate that the filters were giving rather poor results. They were efficient in removing organic matter but were inefficient in the removal of bacteria. The filtered water showed no *B. coli* even in as large quantities as 10 c.c., and the filters were removing a considerable amount of color and turbidity.

An inspection of portions of the watershed showed that there were buildings near the tributaries from which sewage or other contaminating material could readily reach the streams. Except at St. Joseph's college no specific instances were noted in which there was a pollution of the streams at the time of inspection. However, circumstances indicate considerable pollution on the various streams though time would not permit of an inspection of the whole watershed. At St. Joseph's Normal College there is a pond fed by springs from which a small brook flows to the Pocantico river above the reservoir. The outlet of this pond has been dammed up and it is used for bathing by the students of the college. About 200 feet from the pond on a gentle slope, covering an area 470 feet by 135 feet, is an irrigation area for the disposal of the sewage of the college. After passing through a settling tank and a dosing tank the sewage is discharged by means of a siphon into a system of wooden troughs laid on the surface of the irrigation area. Here it finds outlet through holes in the troughs over the whole area. The sewage after passing down through the soil is collected in a system of open tile underdrains and the effluent led to a nearby branch of the brook. The sludge from the settling tank is blown off at intervals into a sludge pit, allowed to drain and finally mixed with earth and disposed of on the land.

Complaints having been recently made that this disposal plant was not operating efficiently, and that sewage was entering the brook and finally being carried into the Pocantico reservoir, a careful inspection of the plant was made by this Department on September 28, 1910. This inspection was made by Mr. C. A. Holmquist, assistant engineer of this Department, and Mr. Farquhar, of the firm of Waring, Chapman & Farquhar, the designers of the plant. As the result of this inspection it was found that sewage was reaching the stream without proper purification. This was apparently due not to any defect in the design of the plant but to the existence of a crack or opening in the clayey soil of the irrigation area, whereby the sewage discharged upon it reached the underdrains immediately. This was shown from the fact that sewage appeared in the outlet of the underdrains directly after it was discharged over the surface of the irrigation area.

I have arrived at the following conclusions:

1. That the filter plant, as shown by analyses made at various times by the State Hygienic Laboratory, is not giving good results and that its efficiency is low.
2. That this low efficiency is undoubtedly due in part to the high rate of filtration which at times is probably double the normal rate for a mechanical filter.
3. That owing to the somewhat uncertain performance of mechanical filters due to the inherent defects in their construction and operation it is important to remove the several sources of pollution now existing on the watershed of the reservoir.

In view of these conclusions I would recommend that the water company be urged to consider the feasibility of increasing the filtering area with a view to lowering the rates of filtration and thus improving the efficiency of the filters. That they take steps to prevent the pollution of the streams entering the Pocantico reservoir. That the trustees of the Christian Brothers Normal School at Pocantico Hills be notified to take immediate steps to correct the defect in the sewage disposal plant and prevent any unpurified sewage reaching the nearby brook. Finally, that if the water company should experience any difficulty in abating the insanitary conditions affecting the water supply, and further, in view of the uncertain elements attending the operation of pressure filters, they should apply to this Department for the enactment of rules and regulations for the protection of the watershed.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

Copies of this report were transmitted to the following parties: Consolidated Water Company, of Suburban New York; Christian Brothers Normal

College, Pocantico Hills, N. Y.; Joseph Hasbrouck, M.D., health officer, Dobbs Ferry, N. Y.; Ralph R. Ryan, M.D., health officer, town of Scarsdale, N. Y.; Francis R. Lyman, M.D., health officer, Hastings-on-Hudson, N. Y.; G. Q. Johnson, M.D., health officer, Ardsley, N. Y.; John W. Small, M.D., health officer, North Tarrytown, N. Y.; Mr. John J. Sinnott, president board of health, town of Mount Pleasant, N. Y.; The Lederle Laboratories, 39 W. 38th street, New York city.

OXFORD (Woman's Relief Corps Home)

ALBANY, N. Y., *February* 10, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation of the proposed additional water supply of the Woman's Relief Corps Home, Oxford, N. Y.

On December 14, 1909, samples of a proposed additional supply were received by the State Hygienic Laboratory. These samples were analyzed, but owing to the fact that they were not received in a satisfactory condition and the information accompanying them not being clear, you directed the Engineering Division to make an investigation of this supply. I accordingly detailed Mr. C. F. Breitzke, assistant engineer, to visit Oxford for this purpose on January 6, 1910.

The Woman's Relief Corps Home is located on a hill along the east bank of the Chenango river, just beyond the eastern boundary of the village of Oxford, about a mile northeast of the center of that village and about six miles southeast of Norwich. The main buildings are located on a wide berme near the foot of a high hill and sloping somewhat abruptly toward the Chenango river, at the edge of which there is a strip of flat, low land about 200 feet wide. The tracks of the Delaware, Lackawanna and Western railroad pass directly at the foot of this slope. A pumping station, including a heating plant and laundry, are located also at the foot of the slope just east of the railroad. The institution has a sewerage system, the outfall sewer passing about 350 feet north of the pumping station and discharging into the Chenango river.

The regular water supply of the institution is derived from springs located on the side of the hill 2,500 feet to 3,000 feet east of the institution, where there are some twenty springs just north of the tracks of the New York, Ontario and Western railroad piped into the upper reservoir, at an elevation of about 300 feet above main building and thence directly to the buildings through a 2½-inch pipe. This is supplemented by pumping water into a second and lower reservoir ordinarily from a tank belonging to the Delaware, Lackawanna and Western railroad, fed by a spring located about 1,000 feet southeast of the institution buildings. The lower reservoir is located on the sidehill at an elevation of about 100 feet above main building and about 1,700 feet east of it. This reservoir was installed in 1902 for fire protection and is connected by a 6-inch pipe with a hydrant system on the institution grounds. The pumps are connected with the same system. Cross connections have been made between this and the regular system both at the lower reservoir and on the institution grounds. In addition to this the system has a 3-inch pipe, through which water can be pumped from the Chenango river at a point about 800 feet northwest of the pumping station.

The upper reservoir is 50 feet long, 20 feet wide and 10 feet deep. It has concrete sides and bottom and is covered over with a wooden roof. The lower reservoir is 40 feet long, 30 feet wide and 10 feet deep and is similar to the upper reservoir in construction. Its storage capacity is about 85,000 gallons. The Delaware, Lackawanna & Western railroad tank is 16 feet in diameter and 15 feet deep. The institution intake pipe enters it 6 feet above the bottom.

There are two Snow duplex pumps at the pumping station: one 7 x 4½ x 8

inches, a feed pump, pumping water from the river to three 100 horse-power boilers of the heating plant; the other, 10 x 6 x 10 inches, used for water supply.

The daily consumption of the institution is estimated to be from 17,000 to 25,000 gallons per day, of which about 6,500 gallons is supplied by gravity from the springs and the remainder pumped from the Delaware, Lackawanna and Western railroad tank. During the past summer the daily yield of the springs has been only about 4,000 gallons. Owing to the heavy draft by the Delaware, Lackawanna and Western railroad engines only 1,000 gallons per day additional supply could be obtained from the tank above referred to. Consequently, water was pumped from the Chenango river and the two systems separated, the kitchen and administration building being supplied from the gravity spring water supply system and the other buildings with river water, the inmates having been warned not to drink it and special tanks with drinking water were provided.

The prevailing drought led Mr. P. J. O'Connor, superintendent of the Woman's Relief Corps Home, to request the State Architect to prepare plans for a new intake from the Chenango river to provide a more abundant supply. Plans were accordingly prepared in September, 1909, which provided for a bulkhead intake works on the Chenango river, a pump well about seventy-five feet west of the pumping station, and a ten-inch vitrified pipe line leading from the intake works to the pump well.

Samples of water were taken at the time of inspection and were sent to the State Hygienic Laboratory for analysis. The results of this analysis are given in the table following page 589.

The samples taken from the upper reservoir indicate a pure and wholesome supply. On the other hand, those obtained from the Chenango river show the presence of a considerable amount of nitrogeneous organic matter, chlorine and large numbers of bacteria of which the *B. coli* type were found present in minute quantities of water as small as one-tenth of a cubic centimeter, facts which are consistent with the discharge into that river of sewage from some 5,000 people at Norwich at a point less than six miles above the proposed intake works. The sample taken from the Delaware, Lackawanna and Western railroad tank shows some contamination which may be explained by the fact that the spring supplying it is located in a field used for agricultural purposes.

The analyses of the samples taken from the proposed pump well showed the presence of a comparatively large amount of organic matter and an excessive number of bacteria. While this may be due in part to the difficulty in obtaining a representative sample and also to the fact that the well has been recently excavated and built, the chlorine content of the water is largely the same as that of the Chenango river, about 200 feet distant.

It is evident that the Chenango river is polluted and therefore should not be used as a source of water supply, even if separated from the regular spring supply for where a dual supply has been installed there is always danger of the polluted one being used for potable purposes. Furthermore, the fact that the pipe line from the intake works to the pump well is to be made of vitrified tile and must cross the line of the institution outlet sewer, there would always be danger not only from a break in the sewer line at the point of crossing but also from the leakage from the sewer which is bound to occur when the ground water level is lowered in dry weather.

The securing of an additional supply from the pump well supplied through collecting drains in the river bottom lands west of the Delaware, Lackawanna and Western railroad tracks is as proposed also improper from a sanitary standpoint. The Chenango river must at times of high water flood the low land along its banks. The soil consists of a thin layer of alluvial soil underlain largely by coarse gravel. From the analyses referred to above it appears that there is infiltration from the river below the point of discharge of the institution sewer. Furthermore, the danger of leakage and infiltration of sewage from this sewer would be great. The proposed pump well is now only 200 feet from the sewers and, if a system of collecting drains is installed, this distance of the sewer would be reduced considerably and there would be danger of infiltration into the system of sewage imperfectly purified in its passage through the soil.

In conclusion, therefore, I recommend that a copy of this report be sent to Mr. P. J. O'Connor, superintendent, Woman's Relief Corps Home, and that he be advised that this Department can not give approval to the two proposed means for obtaining an additional supply either by taking unpurified water from the Chenango river directly or by collecting water by drains in the low lands between the river and the railroad embankment.

It is evident, however, that an additional supply is needed by the institution. It is possible this may be secured either by developing additional springs, by driving wells east of the Delaware, Lackawanna and Western railroad at a place where they will not be endangered by leakage from the institution sewer or by infiltration from the Chenango river, or possibly by driving them in the level ground east of the institution buildings at the foot of the steep slope leading to the reservoirs. Unquestionably, a safe and wholesome additional supply can also be obtained by installing a filtration plant to purify Chemung river water.

As to which of these or other means of securing an additional pure supply would be better and more economical to develop can not be determined without making a more detailed investigation of the problem. Under the circumstances, I would suggest that the institution authorities have such a further and careful study made of the problem in order that they may obtain definite advice as to the best means of providing an additional safe and wholesome supply of water.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ROUND LAKE

ALBANY, N. Y., *June* 22, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation in the matter of the water supply of the Association of Round Lake.

Round Lake is an incorporated association in the town of Malta, Saratoga county, about twelve miles south of Saratoga Springs. It is on the main line of the Delaware and Hudson railroad. During the summer season the population of Round Lake is about 1,500, but the remainder of the year it is only about 500.

The water supply is obtained from a stream whose several tributaries derive their flow principally from springs. The watershed of this stream is located about 1½ miles southwest of the village. Here has been constructed on the main stream a small intake reservoir with an earthen dam. The intake is some 12 feet from the shore of the reservoir on the down stream side, and consists of an upturned elbow having a perforated plate. The water is conducted by gravity to the village through a 6" cast-iron pipe, the flow varying with the draft in the distributing system. The surplus water flows over a circular waste weir, passes through a 12" pipe under the dam, the stream therefrom finally discharging into Round Lake. The works are owned by the Round Lake Association and are under the direction of a water supply committee, of which Mr. Milliard Rogers is chairman. Mr. John D. Rogers is superintendent.

The collecting area is approximately three-fourths of a square mile. The upper end of this area is bounded by high banks of sand with precipitous slopes. From these the water issues in springs. The area is wooded except where a considerable part of the wood has been cut in the upper portions. At the reservoir there is some accumulation of organic matter around the swampy edges at the inlet due to decaying vegetation. A deposit of clean sand washed down from the headwaters of the stream is gradually encroaching on the inlet end of the reservoir. There are no dwellings upon or adjacent to the watershed.

The water works were built in 1887. The water collected from the stream

described above being discharged by gravity into two small reservoirs situated about ½ mile southwest of the village. Here is located a pumping station equipped with a small direct acting steam pump and a boiler. Nearby and on a small hill are two elevated wooden tanks with a combined capacity of 70,000 gallons. They are at about 90 feet higher elevation than the pump. These tanks are kept full, but ordinarily are not used except in case of fire when they are connected with the distributing system by opening the gate on the line to the town. In the summer season the fires are banked in the pumping station and the machinery kept ready for emergency use. The normal pressure in the system at the town is about 15 pounds per square inch; with the elevated tanks, however, this can be increased to about 45 pounds per square inch. The use of the two small reservoirs has been discontinued, the supply now going directly into the distributing system.

The distributing system comprises about 5 miles of mains from 2" to 6" in diameter.

The average population the year round is roughly about 850. Practically all the inhabitants are supplied from the public water supply. There are 300 houses in the community and about 280 service taps, none of which are metered. No figures are available for the daily consumption of water.

An inspection of the Round Lake Association water supply was made on June 16, 1910, by Mr. A. O. True, assistant engineer of this Department. No nuisances or insanitary conditions were found to exist on the watershed.

Samples of the water for sanitary analysis were collected at the reservoir and from the distributing system and sent to the State Hygienic Laboratory. The results of this analysis in parts per million are given in the table following page 589.

The analysis of the sample taken at the outlet of the reservoir indicates the presence of considerable ground water flowing off in the stream. This is shown by the comparatively large percentage of mineral residue and high degree of hardness. This is due, apparently, to the large percentage of water from the numerous springs. The analysis also indicates a considerable amount of organic content which evidently reaches the water in the reservoir and in the marshy land in the lower part of the stream. However, the chemical analysis interpreted in the light of a knowledge of the physical features of the collecting area indicates a normal water from surface and underground sources.

The bacteriological analysis shows a high bacterial count for a surface supply, but this is very probably due to the presence of harmless water forms which find a natural habitat in certain ground waters. No bacteria of the *B. coli* type indicating fecal pollution were present in the 10 c. c. and 1/10 c. c. samples, though one of the three 1 c. c. samples indicated this type of organism. In view, however, of the absence of any permanent sources of pollution on the watershed the results of this one analysis should not be considered as suspicious of intestinal pollution. No *B. coli* was found in the sample taken from the tap in the village, and the total bacterial content of this sample was low.

The sanitary inspection of the watershed would indicate that Round Lake has an adequate supply of water of good sanitary quality. There are no habitations on the watershed and no fixed sources of pollution. It should be borne in mind, however, that accidental pollution of the water due to carelessness may occur through those entering upon or working on the watershed unless careful sanitary inspection is frequently made.

I, therefore, recommend that the water committee make such regular sanitary inspections of the watershed to prevent any occasional pollution which might occur.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

is its own sewage. Combined sewers were installed at Rouses Point in 1905 substantially in accordance with plans approved by this Department in 1891 except that no public sewers have been built north of Pratt street, nor intercepting sewers along the water front. Sewage outlets are at the foot of State, Chapman, Liberty, Academy, Pine, and Champlain streets, the last and most distant of which is only three-fifths of a mile from the intake, and the first three of which are within 1,200 feet of it. In addition to these sewers all houses along the lake front have sewer drains discharging into the lake.

At times of heavy rainfall the volume of storm water discharged with the sewage must necessarily be of sufficient volume to produce currents flowing out into the lake, particularly the three sewers referred to above, which are only 1,200 feet from the intake. The heavy winds from the south referred to above, which raise the waters at the upper end of the lake often to the depth of two feet, induce surface current in the direction of the wind and under currents in a reverse direction, which not only stir up the waters of the lake, but probably also carry sewage which has accumulated near the shores out toward the intake. Direct evidence that such is the case is found in the fact that after such a storm from the south the water from the taps in the village is roily. The danger of sewage contamination at such times is further increased, owing to the fact that severe wind storms from the south will change very commonly to the west and lower the water at Rouses Point a foot. This condition sometimes lasts for several days, and during these times the sewage is also carried from the shore out toward the intake.

Samples of the water were collected at the time of the inspection from the outlet of Lake Champlain near the intake and in the channel and from a tap in the village, and were sent to the State Hygienic Laboratory for chemical and bacteriological analyses. The results of the analyses of these samples, together with those of samples collected by the health officer and the superintendent of water works, on January 11, 21 and 26, 1910, and on February 24, 1910, from taps in the village, from the outlet of Lake Champlain, both near the intake and from the channel opposite the pumping station, and from the lake two miles above the village, three-fourths of a mile from shore south of the end of the breakwater, as well as of a sample collected by a representative of the laboratory on March 29, 1909, are given in the table following page 589.

These results show that all samples of water taken from taps in the village were grossly contaminated, bacteria of the *B. coli* type having been found in all the samples taken, and in the majority of cases even in amounts as small as .1 c. c. No recent chemical analyses have been made of samples taken from the village taps, but if bacteriological analyses can be used as a basis of comparison it appears that the water from the taps contained much more contamination than samples taken from the lake at the point of intake, suggesting the presence of some contaminating influence such as currents of sewage passing the point of intake, or perhaps the inflow of sewage laden water through a possible break in the intake pipe. This source of contamination is one of great danger and is one which should be investigated and remedied without delay.

The sample taken on March 29, 1909, confirms the results of recent analyses and shows that the water has been badly polluted for a considerable period in the past. The samples taken from the outlet of the lake, both at the point of intake and the channel, show that the water is subject to contamination at the point of intake and at times in the channel, which is evidently subject to a variable amount of pollution dependent upon atmospheric or meteorological conditions. The sample taken south of the head of the breakwater also showed some contamination.

That infection as well as contamination of the water supply of Rouses Point has been taking place is further evidenced by the recent epidemic of typhoid fever in that village where some 35 to 40 cases have occurred since the first of last November, and 19 of which occurred during the month of February. The accompanying table gives information concerning 25 of these cases for which report cards have been filed with the Department.

Table Showing Occurrence of Typhoid Fever Cases in Village of Rouses Point, with Accompanying Information from available Records from November 3, 1909, to February 27, 1910

Case	Age	Occupation	Date of onset	Water supply	Milk supply	Shell-fish	Remarks
1	41	Wife of draw-bridge tender.	11/ 3/09	Lake Champlain and village supply.	Farmer at Windmill Point, Vt.	None	Water supply taken from channel in Lake Champlain. Also had been in village daily. Case fatal. Stools and urine disinfected and thrown into channel of lake.
2	14	Daughter of draw-bridge tender.	11/19/09	Lake Champlain and village supply.	Farmer at Windmill Point, Vt.	None	Went to school in village.
3	9	School girl....	12/16/09	Village supply.	Whitman...	None	Died of pulmonary phthisis as result of typhoid.
4	28	Laborer......	1/11/10	Village supply.	Whitman...	None	Half-brother of (3). Premises not in sanitary condition. Typhoid led to development of tubercular meningitis resulting in death.
5	40	Express agent.	1/ 5/10	Village supply.	Neighbor...	None	
6	62	Housekeeper..	1/15/10	Village supply.	Neighbor...	None	
7	8	School boy...	1/31/10	Village supply.	Laware.....	None	
8	41	Dentist......	2/ 1/10	Village supply.	Whitman...	None	
9	34	Dressmaker...	2/ 3/10	Village supply.	Weed......	None	
10	19	Housekeeper..	2/ 5/10	Village supply.	Gibault....	None	
11	13	School girl....	2/ 5/10	Village supply.	Laware.....	None	
12	16	School girl....	2/ 5/10	Village supply.	Own cow...	None	
13	11	School girl....	2/ 6/10	Village supply.	Laware, Whitman.	None	Cases (13) and (14) are sisters.
14	8	School girl....	2/ 8/10	Village supply.	Laware, Whitman.	None	
15	12	School boy....	2/ 9/10	Village supply.	Laware.....	None	
16	28	Housekeeper..	2/12/10	Village supply.	Gibault....	None	Sanitary condition of house not good.
17	22	Laborer......	2/12/10	Village supply.	Whitman...	None	
18	28	Housekeeper..	2/12/10	Village supply.	Own cow...	None	
19	8	School boy...	2/14/10	Village supply.	Laware and neighbor's.	None	
20	7	School girl....	2/14/10	Village supply.	Couture....	None	
21	15	School girl....	2/17/10	Village supply.	Whitman..	None	
22	7	School boy....	2/18/10	Village supply.	Laware.....	None	Brother to case (7).
23	20	Laborer......	2/21 10	Village supply.	Own cow...	None	
24	10	School girl....	2/25/10	Village supply.	Laware.....	None	
25	9	School boy....	2/27/10	Village supply.	Laware and Whitman.	None	

In addition to securing the information presented in the above table a careful inquiry was made as to all possible sources of infection, such as water supply, milk supply, shell-fish, uncooked vegetables and other factors that might have a bearing upon the cause of the epidemic. From the information thus secured it appears the cases of typhoid fever are distributed throughout the village, irrespective of class and age. All the cases used the public water supply. The milk supply came from a variety of sources. So far as could be learned none of the cases had eaten shell-fish during the twenty days immediately preceding the onset of illness and only a few had eaten uncooked vegetables during the incubation period. Precautions have been taken to prevent a further spread of the disease and transmission by secondary infection does not seem to have been a factor in the epidemic.

The milk supply of the village is obtained in part from two dealers, Whitman Bros., having a farm two miles from the village on the road to Champlain, and Joseph Laware, one and a-half miles from the village on Chapman street, and in part from twenty-five to thirty smaller sources. The milk distributed by the two dealers is distributed in bottles. The dairies have been inspected by the health officer who found that they were not properly cared for, but that no sickness existed at either place.

In view of the lack of association of any particular dairy, with the epidemic and the elimination of other factors, there appears to be no doubt that the grossly contaminated and infected condition of the public water supply is responsible for the outbreak of typhoid fever. The fact that this epidemic has not assumed larger proportions has doubtless been due to the warning issued by the local board of health on receipt of the results of analyses from the State Hygienic Laboratory and through the distribution of printed notices calling the attention of the people of Rouses Point to the existence of typhoid fever in the village, the marked pollution of the water, and urged them to boil their water until further notice.

It is evident, therefore, that steps should be taken without delay by the village authorities along two lines; first, as to the prevention of the further spread of typhoid fever; second, the improvement of the water supply.

As to the first, the boiling of the water should be continued until a purer and safer water supply is obtained. The dairies from which the milk supply is obtained should immediately be put into a sanitary condition and every precaution should be observed to prevent a spread of the disease through this medium by a most careful supervision and management of the dairies, especially as to sterilization of the bottles, prohibitions against the carrying of milk bottles into houses where typhoid cases exist, and the guarding against, or quarantining, or removal of any persons or employees about the dairies who may have contracted typhoid fever. It is also important to see that all precautions are taken in the care of patients suffering with the disease with respect to isolation, disinfection of urine, stools, bedding, dishes, etc., and such other measures as will prevent a spread of the disease from these foci of infection.

As to measures which should be taken looking toward the improvement of the supply the data on hand is not sufficient to warrant making any recommendations other than that a further study of the problem be made. The analyses of samples taken from the channel of the outlet of Lake Champlain show that this is undoubtedly subject to pollution and that it would be unsafe to extend the intake and take water from the lake at any point opposite the village. It is possible that the intake may be extended to a point above the breakwater, but even at this point the water has been shown to be polluted, although better than the present supply in quality. It is evident, therefore, that either filtration of the lake water should be adopted or that Lake Champlain should be abandoned as a source of water supply and a new supply obtained elsewhere.

It is only after a careful study of local conditions that a proper and economical solution of the problem can be arrived at. The Department has not facilities or funds to make such a study, and owing to the many factors associated with the improvement of the water supply of Rouses Point it would be the part of wisdom and economy for the village authorities to

employ an expert sanitary engineer to make a study of the problem along the lines suggested in this report, and advise them more fully and in more detail as to the best and most economical means for carrying out improvements to their supply.

This may take some little time and, owing to danger involved in the use of an infected water supply, some temporary but effective method of treatment of the entire supply ought to be made to render it safe until such time as the arrangements for its permanent improvement are completed.

It is possible to temporarily sterilize a supply by the cautious application of hypochlorite of lime in such small amounts as will kill disease germs and not affect to any appreciable degree the chemical quality or wholesomeness of the supply. This method of sterilization has been recently successfully practiced by Jersey City, Albany, Poughkeepsie and other places, and while as at this time, I do not wish to place myself in a position of recommending this method as other than a temporary or supplementary one, I believe it is worth careful consideration and immediate investigation by some competent expert in water purification in the present instance. In any event it should not be undertaken by any one except a competent expert after a careful investigation of local conditions and requirements.

I believe that, if these suggested measures are carried out by the village authorities and the people, a speedy termination of the typhoid fever epidemic will result and that a recurrence of it prevented in the future. I should, therefore, recommend that a copy of this report be transmitted to the local board of health and to the board of water commissioners, and that they be urged to give this report careful consideration and to take immediate action in carrying out the recommendations contained herein.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

SENECA FALLS

At the request of the village board of health, made through the health officer, on September 18, 1910, an investigation of the conditions surrounding the public water supply was made, the report upon which is as follows:

ALBANY, N. Y., *November* 5, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation in the matter of the public water supply of the village of Seneca Falls:

Seneca Falls is a village in Seneca county, located on the Seneca river, between Lakes Seneca and Cayuga. It is on that branch of the New York Central and Hudson River railroad known as the Auburn road, 15 miles west of the city of Auburn and 61 miles southeast of the city of Rochester. The present population is estimated at about 7,000. In 1905 the population was 6,733.

The water supply for the village is taken from Cayuga lake, at a point near the middle of the northern end of the lake, opposite the village of Cayuga. The pumping station is located on the western shore of the lake and about 2¾ miles east of the village of Seneca Falls. The intake extends about half a mile from shore to a crib on the bottom of the lake. The intake pipe is of cast iron, 16" in diameter, and laid with universal joints. The pumping machinery consists of two steam reciprocating pumps manufactured by A. E. Russell, of Newburyport, Mass., each with a rated capacity of 1,500,000 gallons a day. One of these pumps is driven by a cross-compound engine and the other by a double-steeple compound engine. The suction lift of the pumps varies from 5 to 7 feet. The boiler equipment consists of two boilers each of 80 horsepower.

There is a 14" force main from the pumping station to the distributing system and connecting with a standpipe located in the northwestern part of the village. This force main is about 2½ miles in length. The net lift is about 197 feet, which together with the friction head causes a pressure at the delivery of the pumps at times of ordinary operation of 98 pounds per square inch.

The distributing reservoir is a steel standpipe 30 feet in diameter and 100 feet high, holding 502,000 gallons. It is located on high ground in the northwestern part of the village, and when full its water surface is about 125 feet higher than the average elevation of the streets at the center of the village.

The distributing system comprises about 15 miles of castiron mains from 4" to 14" in diameter. The average pressure is approximately 50 pounds per square inch.

The water works were built in 1886 by the Water Works Company of Seneca Falls. The original distributing system was built of cement-lined pipe with a comparatively thin outside shell, presumably of wrought iron. This has been replaced since 1909 by a system of castiron pipes. The water works are owned by the Water Works Company of Seneca Falls. Herbert Payson of Portland, Maine, is president of this company, and S. W. Pratt of Seneca Falls, superintendent of the company.

Of the estimated 7,000 population of the village, about 6,000 are served from the public water supply. There are about 1,400 active service taps, of which 30 are metered. The average daily consumption of water is about 1,000,000 gallons.

An inspection of the Seneca Falls water works and a small portion of the watershed of Cayuga lake was made on November 1, 1910, by Mr. A. O. True, assistant engineer of this Department, accompanied by William M. Follett, M.D., health officer of the village of Seneca Falls. No samples of the water supply for analysis were taken at the time.

Cayuga lake, from which the water supply of the village of Seneca Falls is taken, is in the southwestern part of the Oswego watershed and occupies a central position among the so-called Finger lakes. Cayuga lake has an area of about 67 square miles and its watershed has an area of about 800 square miles.

The principal centers of population on the watershed of the lake are, not including those along the Seneca river, the city of Ithaca, with a population of 14,600, and the following villages: Aurora, Cayuga, Dryden, Freeville, Newfield, Trumansburg and Union Springs, with an aggregate population of about 4,700. Of these, Ithaca, Aurora, Cayuga and Union Springs are located on the border of Cayuga lake, and the village of Trumansburg is situated on Trumansburg creek at a point a little more than two miles southwest of the lake and the mouth of the creek. The city of Ithaca has a system of sewerage. The sewage after passing through a septic tank is discharged into the Cayuga inlet. Most of the other villages have some sewers and cesspools discharging more or less directly into Cayuga lake. The village of Cayuga, which is directly opposite the Seneca Falls water supply intake, is partially sewered, the sewage being discharged without treatment into the lake.

Other sources of pollution exist along the western shore of the lake among the summer residences situated closely together and extending for a distance of about two miles above the water works pumping station. These houses for the most part occupy a narrow strip of level ground between the steep embankment of the road and the water's edge. They are supplied with village water and most of them have water-closets. The latter are discharged together with other household wastes into soil pipes leading into the lake. In this region and about one and one-half miles above the water works pumping station there is an amusement park operated in the summer season by the electric railway company. Drains from urinals and other fixtures in the pavilions of this park discharge into the lake.

Although complaint has been made by the village officials that the embankment which has been built by the New York Central railroad across the northern end of the lake has injured the quality of the water and obstructed the natural flow of the lake so as to increase the amount of pollution reach-

ing the intake, it was not practicable to investigate these claims in order to be able to say as to just what effect this structure has had on the strictly sanitary quality of the water. However, this embankment has obstructed the natural circulation of the water and no doubt injured its esthetic qualities.

In view of the conditions and circumstances obtaining on the Cayuga lake watershed, and more particularly on that part of the lake which furnished the more immediate supply for the village, as outlined above; and also in view of the further evidence of frequent pollution shown by the series of chemical and bacteriological analyses of the public water supply, the results of which are shown in the table folowing page 589, I am of the opinion that the public water supply of the village of Seneca Falls pumped from Cayuga lake, is subject to frequent and dangerous pollution, and may become a menace to the health of its citizens.

A complete consideration of the problem of providing a safe and adequate supply of water for the village entails a study of local conditions and questions of sanitary engineering outside the resources and duties of this Department. However, it is possible to restrict by lawful regulations the uses to which the water of Cayuga lake is at present put with a view to preventing pollution of the water supply, though such a step would probably be expensive, as it would affect the interests of a great number of people.

The Public Health Law provides for the protection of public water supplies through the enactment by the Commissioner of Health of rules and regulations, but it also provides that the municipality or corporation owning the water works benefited shall bear the expense of the construction of or the changes in sewer systems or purification works necessitated in executing any of such rules and regulations. It also provides for just and adequate payment by the corporation benefited for all injuries to property caused in the enforcement of these rules and regulations.

From a chemical and physical standpoint, Cayuga lake water is of excellent quality, though somewhat hard, and if its sanitary quality be improved by purification, it should yield a water supply satisfactory from every standpoint. It would seem that one of the approved processes of filtration together with a possible relocation of the intake would safeguard this supply from the danger of water-carried diseases.

Summarizing from the foregoing consideration, I have come to the following conclusions:

1. That the water reaching the intake of the public water supply is at present subject to frequent and dangerous pollution from sewage now being emptied into the lake.

2. That through the enforcement of rules and regulations enacted by the Commissioner of Health, in accordance with the provisions of the Public Health Law, for the protection of the public water supply of Seneca Falls, the pollution now existing at the lake would be eliminated. The enforcement, however, of such regulations would probably be expensive, and it is questionable if anything less than a complete control of Cayuga lake watershed would be effective in completely removing all pollution. Also that it would not seem practicable to remove by enforcement of rules, only that portion of the pollution existing at the northern end of the lake, because of the possibility of pollution from other parts of the lake being carried by means of currents to the water works intake.

3. That, owing to the pollution of the lake water and the difficulty of preventing the same from reaching the water works intake, the water supply of Seneca Falls should be subjected to some approved process of purification, notwithstanding any protection afforded by rules and regulations applying to the watershed of the lake either as a whole or in part.

I recommend that copies of this report be transmitted to the Water Works Company and the trustees of the village of Seneca Falls, and that they be advised to engage the services of an expert sanitary engineer, to investigate and report as to the best and most economical means for carrying on the above recommendations. Further, I recommend that the attention of the board of health of the town of Seneca Falls be called to the existence of private sewers discharging into the lake from the summer cottages on the

3. That the use of a dual distributing system, one supplying water for drinking and culinary purposes, and the second for all other purposes, is to be deprecated on the ground that obviously the latter, or less pure water, would be frequently used for drinking because of carelessness, inadvertence, or failure to distinguish between the two supplies.

I recommend that the board of trustees be advised to discontinue the use of unpurified water from Keshequa creek as a household water supply for the Craig Colony. That they be advised to defer the development of the spring water supply until they have ascertained conclusively that no permanent source of pollution exists, and that any opportunity for intermittent pollution has been corrected. That they engage an engineer to investigate thoroughly and report upon the most economical means of providing the colony with an adequate and safe water supply. Such an investigation should include a careful consideration of the following: The improvement of the present supplies by the enactment of rules and regulations by the Commissioner of Health for the protection of the watershed, the application of some approved process of water purification or the development of some new source which will yield an adequate and safe supply of water for present and future needs.

I do not think it would be advisable before careful investigation to develop the present works with a view to taking the whole supply from the present spring for two reasons: First, there is no assurance that the present spring would yield an adequate quantity for the needs of the colony; second, in view of the evidence that the spring is at present possibly receiving polluted water, the opportunity for further pollution would be enhanced should the ground water be lowered at that point by an increased draft upon it.

Very respectfully,

THEODORE HORTON,

Chief Engineer

WHITEHALL

On May 26, 1910, President Aubrey E. Meyer and Health Officer J. S. Guinan, M.D., of the village, were in conference with the Chief Engineer of this Department relative to the desire of the trustees of the village to secure a better water supply. Their request that an engineer from this Department be sent to Whitehall to look into the situation, with reference to the public water supply, was complied with, and the results of this investigation are given in the following report:

ALBANY, N. Y., *July* 1, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report of an investigation in the matter of the public water supply of the village of Whitehall.

Whitehall is a village in Washington county, located on both banks of the Mettawee river, at its confluence with Lake Champlain. It is on the main line of the Delaware and Hudson railroad, and part of the northern boundary of the town is coincident with the New York-Vermont interstate boundary. The present population is estimated at 6,000, which indicates a substantial increase since 1905, at which time the census showed a population of 4,148. The industries of the village comprise the following establishments:

Champlain Silk Mills, employing	350 hands.
Delaware and Hudson Company shops, employing	100 hands.
D. F. Keenon Stone Crushing Plant, employing	50 hands.
Whitehall Shirt Factory, employing	50 hands.
Whitehall Lumber Company, employing	35 hands.
Champlain Transportation Company, employing	25 hands.
Staso Paint Company, employing	15 hands.
Whitehall Motor Boat Company, employing	10 hands.

The water supply for the village is obtained from the Mettawee river, otherwise known as East creek, at a point one-quarter of a mile above its confluence with Wood creek, and about one and one-half miles south of the village. Here is situated a pumping station in the low land on the right bank of the river and some 100 feet from the water. The intake extends 12 feet into the river to an intake crib on the bottom. Between the river and the pumping station there is a circular brick suction well 50 feet in diameter, to which the water flows by gravity from the intake crib through a 12" pipe. The pumping set consists of a Triplex Dean pump, of rated capacity of 1,500,000 gallons per day, belted to a Corliss engine. This machinery was installed in 1905. Previous to this the pumping was performed by a Davison single direct acting steam pump which was installed in 1884 at the time of the building of the water works system. This latter pump is now used only in case of emergency. The suction lift of the pumps is about 13 feet. The boiler equipment consists of two boilers of 75-horsepower, and one of 125-horsepower.

There is a 10" force main from the pumping station to the distributing reservoir on West Mountain about one mile west of the village. The net lift is about 260 feet which, together with the friction heads, causes a pressure at the delivery of the pumps at times of ordinary operation of 125 pounds per square inch.

The distributing reservoir is an uncovered basin with earth embankments. It has an area of approximately 1.25 acres, a capacity of 5,000,000 gallons, and an average depth of 12 feet. In addition there is an impounding reservoir, located near the distributing reservoir at a little higher elevation. This reservoir receives its supply from a small stream having a watershed of about 0.2 of a square mile. It has an area of about 3 acres, a capacity of 7,000,000 gallons, and an average depth of 7 feet. Water is drawn from this reservoir as often as it becomes filled and it affords valuable storage when the pumping station is shut down for repair or cleaning.

The distributing system comprises about 8½ miles of castiron mains from 4" to 12" in diameter. The average pressure is approximately 100 pounds per square inch.

The water works were built in 1884, though a report was made upon the problem of a public water supply some ten years before. At that date much consideration was given to the practicability and economy of securing a complete gravity supply from a watershed comprising a system of ponds and streams on the mountain 3½ miles southwest of the village.

The water works are owned by the village and are under the direction of the board of water commissioners, Mr. S. W. Perry, president; Mr. Fred S. Cowan, superintendent.

Whitehall has an estimated population of 6,000, of which about two-thirds are connected with the public water supply. There are 607 service taps, of which 204 are metered. The average daily consumption of water is about 750,000 gallons, of which approximately 70 per cent. represents domestic use; 25 per cent., commercial use, and 5 per cent., public use.

An inspection of the Whitehall water works and the watersheds of several proposed new supplies for the village was made on June 14 and 15, 1910, by Mr. A. O. True, Assistant Engineer of this Department.

Samples of water for sanitary analysis were collected from Long Pond and from the present system and sent to the State Hygienic Laboratory. The results of this analysis in parts per million are given in the table following page 589. No chemical analysis was made of the present water supply at this time.

The sample taken at the tap in the Hall house shows a bacterial content in that point of the distributing system at that time of 450 per c.c. This is a high bacterial count for a surface water supply and is probably due to the presence of organic matter from animal sources. While some ground waters may contain at times great numbers of harmless bacteria, which find sustenance on the mineral contents of the water, surface supplies showing more than 300 bacteria per c.c. are looked upon with suspicion. It is also seen that one-third of the 10 c.c. samples show the presence of B. coli or bacteria of that type. While the occasional occurrence of this type of intestinal

bacteria in large samples would not necessarily indicate gross pollution, nevertheless, its appearance would be suspicious and, in this case, in conjunction with the knowledge that sewage is being discharged into the river above the water works, would be indicative of an unsafe water.

The chemical and bacteriological analysis of the sample taken from Long Pond is consistent with what would be expected from an unpolluted surface supply. B. coli type of organisms are absent and the total contents of bacteria is but 60 per c. c. The color is somewhat higher than is usually found in a river or stream receiving no swamp water. This is probably due to the collection of leaves and other dead organic growths at or near the outlet of the pond. The other figures for the mineral and organic contents are normal for an unpolluted surface supply in this locality, with the possible exception of the chlorine which seems somewhat high. In the light of the physical characteristics of the watershed this water appears to be an excellent source of supply from a sanitary standpoint.

The high bacterial count and presence of B. coli type of organisms in the sample taken from the school well would indicate considerable contamination from organic matter reaching this water.

In discussing the question of the public water supply of the village of Whitehall, I shall confine myself largely to the condition of the present supply from a sanitary standpoint. It is not the purpose of this report to inquire into, or make recommendations upon, the engineering problems which must be carefully considered in improving the water supply of the village. While it is the intention and duty of this Department to render such advice and assistance, as it is possible to do within the limitations of the resources allotted to such purposes, in procuring a safe and adequate supply of water for the community, it is not within its province to undertake any extended study of local conditions with a view to making final recommendations, or drawing conclusions as to the best course for the authorities to pursue.

The Mettawee river, from which the water supply of the village of Whitehall is pumped, rises in the mountains of Dorset, Vermont, about 27 miles southeast of Whitehall. According to the United States Geological Survey topographic maps the watershed of this stream above Middle Granville is 161.5 square miles, and between that point and the confluence of the Mettawee and Wood creek 46.1 square miles, making a total watershed above the present pumping station of about 207 square miles. According to the report of the State Engineer for 1904 the discharge of the Mettawee river, at the first bridge above the junction with Wood creek was, on September 17, 1903, 57.8 cubic feet per second, or the equivalent of 0.217 cubic feet per second per square mile of tributary watershed. This is in all probability nearly a minimum flow for a stream of this character.

The principal centers of population on the watershed are Dorset, Vt.; Pawlet, Vt.; Wells, Vt.; Granville, N. Y.; Middle Granville, N. Y.; Truthville, N. Y.; and North Granville, N. Y. The population of these communities along the river probably aggregates about 12,000. The largest of these is the village of Granville, N. Y., having, in 1905, about 3,000 people.

This village is partially sewered, the sewers having been built for the most part by private parties, and subsequently were taken over by the corporation. The sewage from these sewers is disposed of by discharging into the Mettawee river below the Granville water works intake.

At Granville, and also at Middle Granville, there are numerous privies near or directly over the stream.

In the winter and spring of the years 1904–1905–1906 and 1907 there were outbreaks of typhoid fever at Whitehall, which were investigated by this Department. After a careful study of the conditions at Whitehall and on the watershed above the village water works this Department reported that the prevalence of typhoid fever was undoubtedly due to the pollution of its water supply by the village of Granville and other places on the watershed. These dangerous conditions were brought to the attention of the board of health of the town of Granville, and orders were issued to abate the nuisances and discontinue the discharge of sewage in violation of section 76 of the Public Health Law.

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In so doing this Department did all within its power to correct the prevailing conditions and safeguard the water supply of the village of Whitehall. There is no provision in the Public Health Law for enforcing the discontinuance of the discharge of sewage from sewers constructed prior to 1903. Hence, the recommendation of this Department, in 1907, to safeguard the water supply of Whitehall by some approved process of purification.

From the results of the several investigations made by the chemists and engineers of this Department, I am of the opinion that the present water supply of the village of Whitehall is dangerously polluted by communities up stream, and is not a safe supply in the absence of any process of purification.

The alternative to the purification of the present supply is the development of a new supply. It was with a view to a further consideration of new sources of supply by the village that one of the assistant engineers of this Department accompanied some of the officials of the village on an inspection of two watersheds on the mountain but a few miles distant. The indications are that these supplies are of excellent quality and, with ordinary precautions, free from any pollution. The quantity of water which these supplies can be expected to furnish, and the amount of storage which it would be necessary to provide in order to insure a constant reserve in the future, are questions of great importance, and involve engineering problems which require investigation by a professional engineer.

I am of the opinion that the present water supply of the village of Whitehall is at times seriously polluted by sewage and, therefore, may become the source of disease to the village. Such insanitary conditions as have been shown to exist upon the watershed of the present supply cannot probably be wholly eliminated. The village should, therefore, have recourse either to the development of a new source of supply or the purification of the present supply. Such a procedure involves questions of sanitary engineering which require careful inquiry and study.

In conclusion, I recommend that the corporation of the village of Whitehall take steps to improve their water supply and retain an engineer to fully investigate local conditions, and report on the best solution of the problem on the basis of health and economy.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer.

INVESTIGATION OF OUTBREAKS OF TYPHOID FEVER

INVESTIGATION OF OUTBREAKS OF TYPHOID FEVER

Although typhoid fever through the State during 1910 was on the average less prevalent than for the past decade or semi-decade, it appears that the number of outbreaks or cases of undue prevalence of this disease in cities and villages were nevertheless more numerous. In most, but not all, of these cases the Department was appealed to for aid in searching out the sources of infection and in giving recommendations for remedial measures.

Since the sources of infection responsible for such outbreaks are in general most frequently found in conditions associated with infected water supplies, infected foods and insanitary conditions of living or premises, and involve frequently many questions of a strictly engineering nature associated with water supplies and sewage disposal, this epidemiological work devolved largely upon the Sanitary Engineering Division. In every instance a careful study was made of the infected territory and a searching investigation made to determine the source of infection. This investigation work was not always simple but was nevertheless ultimately successful, for the sources of infection were discovered and measures promptly recommended to suppress them. The places, where the prevalence or epidemics of typhoid fever were thus investigated and reported upon by the Engineering Division during 1910, are given below, and in all cases, copies of the following reports setting forth the results of these investigations were sent to the proper local authorities.

HOBART

This Department being notified early in February, 1910, of the occurrence in this village of some twelve cases of typhoid fever, within the short period of three weeks, an investigation was ordered, and its findings are presented in the following report:

ALBANY, N. Y., *February* 23, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your directions to investigate the causes of a recent outbreak of typhoid fever in the village of Hobart, referred to you by Dr. G. L. Hubbell, health officer of the village, and to make such recom-

mendations in the premises as the facts in the case would seem to warrant, I beg to submit the following:

Hobart is a village having a population of about 600, and is situated in the town of Stamford, Delaware county, at the junction of Town brook and the Delaware river. It is provided with a public water supply furnished by a water company, of which Mr. Jacob Lawrence is president, and Mr. A. J. Lawrence is superintendent. The village is not provided with a public system of sewers, but there are a number of private drains which discharge into Delaware river and Town brook. The topography of this section of the State is rather precipitous, and much of the soil is of a sandy nature. The land in this vicinity has been largely denuded of forests, which has a tendency to increase the flood flow of the streams.

The water supply furnished by the Hobart Water Company is derived from two sources, namely, an old source from two small impounding reservoirs on the Grant stream, about one-half mile east of the village, and a new supply from Town brook, at a point about three miles east of the village. The average daily consumption varies from about 150,000 gallons in winter to about 350,000 gallons in summer, of which about 50,000 to 100,000 gallons are used for domestic consumption, 50,000 to 100,000 gallons by the Slauson & Decker Creamery and 50,000 to 150,000 gallons by the Ulster and Delaware Railroad Company.

The old supply derived from Grant stream has a watershed of about two square miles, upon which are located some five houses, three of which are used as summer boarding houses, having a population of from 90 to 100 persons, or approximately 40 to 50 per square mile. One of these places has a privy without a vault, on the slope of a drainage channel, within 100 feet of the main stream. Another place, where about 100 boarders are accommodated during the season, has a cesspool in gravel within about 75 feet of and slightly above the stream. At other places stables are located near the stream and manure from the farms in this district is spread upon the fields, and at the time of our inspection one of these fields at the edge of the stream was so spread with manure.

The reservoirs on this stream are shallow, open impounding reservoirs, having masonry covers, and the earthern dams forming them were in a dilapidated condition. The upper reservoir has a storage capacity of about one-half million gallons and the lower reservoir about 300,000 gallons. The lower reservoir has a masonry well, 3 x 4 feet and a depth of 7½ feet, partially filled with charcoal, and from the bottom of which an 8-inch main leads to the village. Both reservoirs are badly silted and are in a dirty condition. In fact, the entire works of this old supply are in bad repair and unsatisfactory condition.

The new supply on Town brook comes from a watershed having an area of about eight square miles and a population of about 125 persons upon it, which is equivalent to sixteen persons per square mile. There are some thirty or more houses on the drainage area, of which about eighteen have stables and privies in dangerous proximity to the streams. Owing to the severe snowstorm and the difficulty of making an inspection at this time of the year, a complete inspection of the watershed of Town brook was not attempted. Judging from the portion of the watershed covered by this inspection, it will be safe to assume that many of the privies on this watershed are probably constructed without vaults and are a serious menace to the purity of the supply.

The intake of the Town brook supply comprises a small intake well and dam with a strainer of gravel and sand. The intake well is located at the edge of the stream, and its construction forms a part of the dam projecting across the stream at this point. The dam is four feet high, three feet of which is below the bed of the stream. The strainer system is located just in front of the intake well, the soil being excavated and the place filled in with one and one-half feet of coarse gravel above which is a layer of two and one-half feet of sand and gravel.

A 6-inch pipe connects the intake well with a covered, concrete storage reservoir about 250 feet distant, the reservoir being 24 feet long, 5½ feet wide

and 6 feet deep, from the bottom of which a 6-inch gravity supply main leads to the village. The above descriptions of these two supplies are given somewhat in detail in order that a clearer understanding may be had of the relation of these supplies to the outbreak of typhoid fever in the village, which will now be considered more in detail.

It appears that some twelve cases of typhoid fever have occurred in the village between January 25th and February 17th, the time when our engineer visited Hobart to make his investigation. The occurrence of these cases of typhoid fever, together with certain important information concerning them, are shown in a table which accompanies this report. In addition to securing the information so presented, a careful inquiry was made as to all possible sources of infection, such as water supply, milk supply, uncooked vegetables and other factors that might have a bearing upon the cause of the epidemic.

By reference to the table, it will be seen that all of the cases used the public water supply, and that eight out of the twelve used the milk supplied by one of the milk dealers in the village, Mr. Justin Decker, who supplies some thirty families, the rest of the people in the village using milk supplied from their own cows or their neighbors who own them.

Since eight of the twelve cases used the milk from the Decker farm a careful inspection was made of this dairy. There are some twelve cows kept on this dairy, and the condition of the stable was found to be fair. The milkhouse was separate from the stable, and all the washing and bottling is done in the milkhouse. The bottles are washed by hand with a brush and washing powder, and hot water obtained from the Slauson & Decker creamery was used to wash the bottles. The water otherwise used was piped from springs on an unoccupied hillside.

It was found that no hands upon the farm had been afflicted in any way with typhoid fever or any ailment resembling it. In fact, there was nothing connected with the operation and management of this farm which would indicate that the milk supplied from it was in any way responsible for the outbreak of typhoid fever in the village.

So far as can be learned, only one of the cases had eaten shellfish during the preceding twenty days or within the incubation period prior to the outbreak of the epidemic. Furthermore, this case ate oysters six days before the onset of his illness, which is too early an incubation period to indicate that these oysters were the source of the illness.

Transmission by flies or transmission by secondary infection did not seem to be a factor in the present epidemic, as can be readily gathered from the sequence of the cases and the fact that at this season flies are not prevalent.

It now remains to consider the question of the water supply, and the facts associated with the epidemic. These facts and the condition of the water supply seem to furnish evidence that this supply was responsible for this outbreak of typhoid fever. A sample for chemical analysis was secured from the new supply, and samples for bacteriological analysis were collected from both the old and the new supply by Assistant Engineer C. F. Breitzke during the investigation. These were forwarded to the Hygienic Laboratory for analysis, and the results thereof, together with the results of analyses of samples collected under the direction of the health officer three days before our engineer collected samples, accompany this report.

These analyses indicate that the old supply was very seriously contaminated, fecal pollution being found in the smallest quantities tested, and they corrobate very clearly the evidence of pollution which was found from our inspection of the watershed. The analyses of the new supply, while showing somewhat less contamination, indicate, however, that this supply also receives contamination as might be expected from the conditions found to exist upon the Town brook watershed. The most noteworthy and coincident fact associated with the present epidemic is that the old Grant stream supply is not used regularly to supply the village, but that on January 10th and again on January 23 and 24, 1910, this supply was drawn from, owing to the difficulties encountered at the Town brook intake works, and that at this time a flood condition occurred upon these streams.

In other words, during this period of heavy rainfall and high flows a water was temporarily supplied the village which drained an area more or

less grossly polluted with human pollution, and infection derived from this source was quickly transmitted to the people of the village on these dates. The dates on which this water supply was used would bring the cases within the incubation period of the disease, and when we consider the amount and probable intensity of this infection and the absence of other causes as outlined above, there is the strongest presumptive evidence that the water supplied from this watershed on these dates was responsible for the outbreak of this epidemic.

If any further evidence is needed in this respect, it can be no better shown than by the unusual facts presented by a closer study of the occurrence of the disease during the epidemic. Thus we have some nine of these cases occurring between the dates of January 25th and January 28th, which corresponds to the infection received the first time the water from Grant stream was turned into the mains on January 10th, the time subsequent to January 10th until the outbreak of these cases being approximately the accepted incubation period of about two weeks for typhoid fever. Again, we have some three other cases falling between the dates of February 9th and February 12th, which corresponds to the infection received on January 23d and 24th, the time subsequent to January 23d and 24th until the outbreak of these cases being approximately the accepted incubation period of about two weeks for typhoid fever.

It should not be lost sight of, however, that the supply of water drawn from Town brook is also polluted and that, although a small portion, if any, of this supply, was delivered to the people at the time of the excessive flood conditions on the watershed, there is a strong possibility, if not a likelihood, that this supply may have also been partially responsible for the infection which caused this epidemic. The analyses indicate very clearly that the new supply is contaminated, although it must be admitted that the danger from the new supply is considerably less than that from the old supply.

In view, therefore, of the facts and conditions briefly outlined in the foregoing, it is my opinion —

1. That the occurrence of some twelve cases of typhoid fever in the village of Hobart within the short period of three weeks is sufficient to constitute an epidemic of this disease.
2. That the cause of this epidemic was an infected condition of the public water supply.
3. That in all probability the infected condition of the old supply from Grant stream was the more important cause of this outbreak.
4. That the new water supply from Town brook is subject to considerable contamination of a dangerous nature, and that this source may have also been partially responsible for the recent outbreak of the disease.
5. That whereas some eight out of twelve cases of the disease took milk from the Decker dairy farm, an inspection of the condition of this farm indicates that the condition of management and methods of handling milk make it improbable that this supply had any responsibility in this epidemic.
6. That other sources of infection frequently associated with causes of epidemics such as secondary infection, fly transmission, use of uncooked foods, etc., were not found to be factors in either the cause or spread of this epidemic.

In view of the foregoing conclusions, I would submit the following recommendations:

1. That the old supply of water taken from Grant stream be entirely abandoned as a permanent or temporary source of supply.
2. That immediate steps be taken to improve the new supply from Town brook by removing all direct pollution upon the watershed and possibly supplementing these precautions by more effective means of purification than that secured by the present system of strainers.
3. That if any difficulties are experienced by the water company in securing a removal of pollution upon the watershed of the Town brook supply, the water company apply to you for the enactment of rules and regulations for the further protection of this supply.

4. That until a safer and purer water supply is furnished by the water company or the village, the people continue to boil the present supply.
5. That in regard to the milk supply every precaution be observed to prevent a spread of the disease through this medium by a most careful supervision and management of the dairies, especially as to sterilization of the bottles, prohibitions against the carrying of milk bottles into houses where typhoid cases exist, and the guarding against, or quarantining, or removal of any persons or employees about the dairies who may have contracted typhoid fever.
6. That all precautions be taken in the care of patients suffering with the disease with respect to isolation, disinfection, etc., as will prevent a spread of the disease from these foci of infection.

I believe that, if these recommendations are carried out faithfully by the village authorities and the water company and the people, a speedy termination of the outbreak of typhoid will result, and that a recurrence of it may be prevented in the future. I should, therefore, further recommend that a copy of this report be transmitted to the local board of health and the water company, and that they be urged to give this report careful consideration and that they be urged to take immediate action in carrying out the recommendations and conclusions contained therein.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

TABLE SHOWING OCCURRENCE OF TYPHOID FEVER CASES IN VILLAGE OF HOBART, WITH ACCOMPANYING INFORMATION FROM JANUARY 25, 1910, TO FEBRUARY 12, 1910

CASE	Age	Occupation	Date of onset	Milk	Water	Shellfish	Remarks
1	33	Merchant	1/25/10	Decker	Village supply	No	In poor health; had attack of pneumonia about Jan. 20, 1910.
2	69	Retired farmer	1/25/10	Decker	Village supply	No	Apparently strong and robust man; case developed quickly.
3	36	Blacksmith	1/25/10	Decker	Village supply	No	Had bladder trouble and was on special diet, with instructions to drink lots of water. Was in a weakened condition.
4	38	....	1/28/10	Decker	Village supply	No	Lived in same house with Case No. 1. Was in a weak condition.
5	17	Student	1/28/10	Neighbor	Village supply	No	
6	33	Carpenter	1/28–30/10	Neighbor	In part	No	These two men worked in C. L. Foote's Sale and Exchange Stable doing difficult overhead carpenter's work. Drank freely of the village water on Jan. 10, 1910, the day the poor water was turned on.
7	50	Carpenter	1/28–30/10	Creamery	Village supply	No	
8	18	Clerk	1/28–30/10	Decker	Village supply	No	Left town Jan. 15, 1910.
9	25	Visitor	1/28–30/10	Decker	Village supply	No	Left town Jan. 15, 1910, for home at Phillipsburg, N. J. Lived in same house as Case No. 8.
10	63	Cobbler	2/ 9/10	Decker	Village supply	No	In poor health previously.
11	14	Student	2/10/10	Decker	Village supply	No	Live next door to Case No. 3.
12	13	Student	2/12/10	Own cow	Village supply	Yes	Ate oysters about a week before taken sick.

ANALYTICAL DATA OF WATER SUPPLIES

Laboratory number	MUNICIPALITY	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as: Free ammonia	Nitrogen as: Albuminoid ammonia	Nitrogen as: Nitrites	Nitrogen as: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c	B. coli type (+ = present, — = absent, Δ = complete test): 10 c. c.	1 c. c.	$\frac{1}{10}$ c. c.
B—3011	Hobart	Delaware	Tap in Dr. Dart's residence	2/14/10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	550	2+0—	0+2—	0+2—
B—3010	Hobart	Delaware	Town brook reservoir	2/14/10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	250	2+0—	0+2—	0+2—
B—3027	Hobart	Delaware	Tap in Dr. Hubbell's residence	2/17/10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3000	1+1—	1+1—	0+2—
B—3028 C—1647	Hobart	Delaware	Tap in house on line of water main, about two miles below Town brook intake	2/17/10	5	10	1m	2m	30	12	18	.022	.048	.002	0.60	1.70	1.00	9.50	650	5600	1+1—	2+0—	0+2—
B—3029	Hobart	Delaware	Grant stream just below old reservoir	2/17/10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7200	2+0—	2+0—	1+1—

TOWNS OF LONG LAKE AND WEBB

The prevalence of typhoid fever in the summer resorts located in these towns was brought to the attention of this Department by the health officer of the town of Long Lake and by individuals who were visitors there during the summer. These places were visited by one of the inspecting engineers. and reported upon as follows.

ALBANY, N. Y., *October* 14, 1910.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following summary on an investigation made October 8-13th, of the prevalence of typhoid fever at Raquette Lake, Long Lake, Eagle Bay and Eagle Lake.

Raquette Lake

At least four cases occurred at Raquette Lake this summer.

1. Three-year old son of Mrs. L. Blanchard was taken down with typhoid about the 10th of August. Home located about a mile from station. Played in shallow water of lake. Cause not known. Fed on evaporated milk.

2. Five-year old son of Mrs. F. D. Carlin was taken down about first week in August. Lives about 300 feet from station. Played a good deal in lake, and origin of fever attributed to polluted lake water.

3. Butler at Mrs. R. Beagulin's camp. Came down with typhoid about first week in August. Sent out to Utica immediately. No information as to probable cause.

4. Winchester McDowell, photographer, camping at a small island about 500 feet from station, contracted typhoid about first week in September. Drank lake water, as there was no other water on the island.

Three cases at this end of the lake occurred last year among natives. No information of any other cases among campers could be obtained, as they had all left the camp.

Most of the cases have occurred at the upper end of the lake. This receives considerable sewage from the Raquette Lake Hotel, two cottages, the store, and from the railroad station. There are ten closets at the hotel, one of which has five seats. In summer the hotel accommodates about forty people a day and has a large bar trade.

A restaurant is connected with the railroad station, and in the summer season a large number of people pass through the station every day.

The sewage is discharged directly into the lake, and at the time of the inspection fecal matter and paper was seen floating on the water or suspended in it.

Eagle Bay — Fourth Lake

One case originating at Eagle Bay was reported from Rome, N. Y. This was that of Miss Linda Raffauf, who was staying at the Eagle Bay Hotel. She had been at the hotel five weeks before being taken down. The sanitary conditions at the hotel are good and no evidences of insanitary conditions affecting the drinking water could be obtained.

Miss Cecil Jones of Forestport contracted typhoid fever while at Eagle Bay.

Information that two other cases at the foot of the lake had occurred this summer were obtained, but these people had moved and no reliable facts could be obtained.

Long Lake

Six cases of typhoid fever this summer were reported by the health officer. The first case, J. Dwyer, occurred about the middle of July. J. Dwyer came from Mineville, Essex county, about the first week in July and stopped at a boarding-house in Long Lake. Mineville had a small epidemic of typhoid at this time. About three weeks after J. Dwyer came down with typhoid, two

other cases at the same boarding-house developed, and shortly afterward three more cases. All these either boarded at this house or were employed there, and the last five cases came from direct contact with the first.

Eagle Nest Country Club — Eagle Lake

Eighteen cases of typhoid originated at the Eagle Nest Country Club this summer. The first case was a caddy boy employed by the club, who was taken down about the first week in August. He was sick about eight days before it was diagnosed as typhoid fever. He was removed to New York city. About a week later another caddy boy was taken down, and then one after another, nine more caddy boys. These eleven caddy boys were all sleeping in the same room in intimate relationship with one another. They all came from the Brace Farm School, Valhalla, N. Y. They arrived at Eagle Nest July 1st, and the first boy taken down had been there five weeks.

Mrs. E. Stack, a laundry girl, boarding at this house, was taken down with typhoid fever about the 15th of August. Walter Hockschild, the son of a club member, who often played with the caddy boys, was also taken down with typhoid about this time. The caretaker stated that five other persons, some of whom were guests at the place or their maids were taken down shortly after they had left the club.

The house in which most of these cases prevailed was used to board the help. Until this year typhoid did not appear at any other house on the place. The first case at this house was in 1906, when Miss Kitty Roas, the sister of the proprietor's wife, was taken sick with typhoid. In 1907 a young man boarding at this house contracted typhoid. In 1908 a chore man boarding at this house contracted typhoid. In 1909, five cases were present. A laundry woman, Mrs. Tibido; a carpenter, Richard Lewis; a general helper, Henry Johnson, and two carpenters, Paul Kruger and Paul Christianson, all boarding at this place, were taken down with typhoid fever.

The sanitary arrangements at the house were good. Flush closets, running water with enameled washbowls and bathtubs drain into a cesspool. The drinking water comes from a spring half a mile up on a hill. No houses are anywhere above it or on its catchment. It is piped to the place. The milk is obtained on the place.

Mrs. Waddell, who has been cook at this boarding-house for the past five years, has had typhoid fever many years ago. Circumstantial evidence seems to point to her as a carrier of typhoid bacilli and giving origin to the first case. The others were contracted by direct contact.

Respectfully submitted,

FRITZ M. ARNOLT,

Inspecting Engineer

ALBANY, N. Y., *October* 20, 1910.

MR. F. H. PLATT, *No. 2 Rector Street, New York City:*

DEAR SIR: — With reference to the alleged prevalence of typhoid fever in the vicinity of Raquette Lake which you took up with me recently, I beg to say that I have had one of our inspecting engineers visit Raquette Lake and other lakes in the vicinity of this one to inquire into the question of the occurrence of typhoid fever during the past summer, and I inclose herewith his report as to what he found in this action.

You will note from the report that with the exception of one local epidemic that occurred at the Eagle Nest Country Club on Eagle lake, which is still under investigation as to the probable cause, the number of cases found were somewhat scattered and their origin, owing to the general transiency of residents, somewhat obscure. Notwithstanding this obscurity, however, there appears to be sufficient grounds to believe that some of these cases may have been contracted as the result of insanitary conditions and practices at the camps and hotels in this section.

This question of the sanitary condition of summer resorts is one that has been under special investigation by the Department for the past three years

and the Department has spent considerable time and has used what powers it possesses under the Public Health Law in trying to improve the conditions of many of these resorts. Practically all of the hotels and resorts having a capacity larger than twenty-five persons have been visited by inspectors of the Engineering Division during the past three summers and notices have been sent to all proprietors where insanitary conditions were found to exist notifying them of the violations of the Public Health Law and seeking their co-operation in trying to remove these conditions. As a result of reinspections it has been found that many of these places have corrected the insanitary conditions and at the same time it was found that in some cases they have not been corrected, and these later will be made the subject of further action by the Department before the opening of the next summer season.

As you know, the Public Health Law does not give the State Commissioner of Health peremptory power to remove pollution from the waters of the State except in certain restricted cases, and as the law now stands the local board of health is the only body that can proceed directly against any violation that is discovered within its jurisdiction. During the past two winters I have strongly favored, and bills have been presented to the Legislature which would confer upon the State Commissioner of Health the necessary authority and power to compel the removal of pollution in cases where it was found necessary. These bills, as you may remember, were defeated at both sessions of the Legislature, and until such legislation is passed, my powers are limited largely to those of recommendation.

I wish to assure you of my deep interest in this matter and in the present case I am writing to the local health board in this section pointing out such insanitary conditions as are found to still exist at Raquette Lake and in this vicinity and pointing out to them their duty in enforcing such powers as are vested in them in the removal of any pollution that now exists.

I trust that this action will result in an improvement of the insanitary conditions in this district and that if the matter of further legislation is brought up during the coming session of the Legislature, that I will be more successful in securing the increased powers necessary to more effectively removing pollution and of otherwise improving the sanitary conditions of our summer resorts in this State.

Yours respectfully,

EUGENE H. PORTER,

Commissioner

ALBANY, N. Y., *December* 14, 1910.

Mr. J. W. EBER, *Superintendent, N. Y. C. & H. R. R., Utica, N. Y.:*

DEAR SIR: — In further reference to my communication of December 5, 1910, relative to the construction of a sedimentation basin to treat sewage from the Raquette Lake House at Raquette Lake, N. Y., I beg to state that following an investigation of the prevalence during the past summer and fall of typhoid fever at Raquette Lake and vicinity, I am taking up with the several property owners at Raquette Lake the question of eliminating by direct discharge of sewage into the lake, and for this reason I am writing to suggest that in the plans for treatment of sewage from the Raquette Lake House, which, Mr. Patrick Moynehan of Raquette Lake informs me, you are to have prepared, you provide for the treatment of sewage from the railroad station of the New York Central and Hudson River railroad as well as from any other properties owned by the railroad company at Raquette Lake.

Trusting that you will give this matter early consideration and that provision will have been made for partial treatment of all sewage for the discharge of which into the lake the railroad company is responsible before an inspection of conditions at Raquette Lake is again made by an inspector from this Department, I am,

Very respectfully,

EUGENE H. PORTER,

Commissioner

MORAVIA

On March 18, 1910, it was reported to this Department that several cases of typhoid fever had developed in this village and Dr. H. H. Crum, medical expert for this Department, was at once sent to Moravia to investigate. The findings of the medical expert indicating the probability of the public water supply being the source and medium of infection, the investigation was carried further with the co-operation of the Engineering Division, the report thereon being as follows.

ALBANY, N. Y., *April* 8, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your direction, I beg to submit the following report of an investigation of the public water supply of the village of Moravia with special reference to a recent outbreak of typhoid fever which has occurred in that village.

Although the primary object of this investigation was in connection with the water supply, considerable attention was given also to the question of the extent and cause of the recent outbreak of typhoid fever in the village, and for the purpose of securing the necessary information concerning these two matters, Mr. C. F. Breitzke, assistant engineer, was detailed to visit Moravia on March 28th. The information and data secured by him and by Dr. H. H. Crum, medical expert, and Dr. H. E. Anthony, local health officer, who had previously submitted reports to you concerning the recent outbreak of typhoid fever, and the results of the laboratory analyses of samples taken from various sources comprising the water supply of the village, will be presented and discussed as follows:

Moravia is an incorporated village in the southern part of Cayuga county. It is located on the east side of Owasco inlet, about four miles south of Owasco lake, and is a station on the Lehigh Valley, eighteen miles south of Auburn.

The village has a population of 1,500, about 80 per cent. of whom obtain their water supply from the public water works. The water is obtained from springs and at present is furnished to the consumers by the Moravia Water Company, of which Mr. W. E. Greenfield is secretary and general manager. The village, however, at a recent election voted to take over the works on May 1, 1910.

The water works were installed in 1885 and consist of a number of springs piped to an equalizing and distributing reservoir, and about seven miles of mains ranging from 1½" to 10" in diameter. This supply is supplemented at times by pumping from a driven well. There are about 250 service taps, none of which are metered. The average daily consumption is estimated at 125,000 gallons, and is furnished under an average pressure of 80 to 90 pounds per square inch.

The water supply is taken from five springs, three of which are being used at the present time. Four of these springs are located in the town of Summer Hill and one in the town of Moravia, four miles southwest and one mile east of the village, respectively.

The first spring, known as the Sears spring, is situated on the Dwight Harris place in the town of Summer Hill, about 500 feet east of the highway forming the boundary between that town and the town of Locke. The spring has been inclosed by rubble masonry well-curbing 3½ feet in diameter and about 3 feet deep, projecting a few inches above the surface of the ground and covered over with a flat wooden roof. It is located in a slate formation covered by a thin surface layer of loam and hardpan, in a small valley, at the edge of a small brook, on the opposite side of which and between it and the highway are a house, barn, large hennery, hog-pen, and privy on ground sloping toward it. While under ordinary conditions this stream would inter-

cept surface drainage from these buildings, the spring is so situated that in time of flood, surface water can easily enter it. The henhouse and privy are about 100 feet and 225 feet from the spring, respectively. The privy is without a vault and until recently the feces of a family of six have been deposited directly on the surface of the ground. This condition existed at the time of the heavy thaw and flood on February 27 and 28, 1910. Just prior to the inspection on March 28, 1910, however, the accumulation of feces had been removed and our engineer was informed during his visit that steps were being taken to provide the privy with a water-tight removable box. Two years ago there was a case of "grippe" in the above house.

The second large spring making up the main source of the Moravia water supply is located in a gully about 400 feet south of the one just described and is known as the Ingalls spring. This has been excavated down to rock and has been inclosed in a concrete vault 7 x 9 feet in plan and about 3 feet deep. The walls rise about 2 feet above the bed of the stream and the spring has been covered over with a wooden house. The stream which flowed in the gulley has been diverted by the spring-house through a drain. The inspection showed, however, that at times of high water the stream floods the gully and can flood the spring. About a mile east of the spring on the west side of the highway leading from Lickville to North Summer Hill, there is a privy without a vault at the Lovelace place on the line of drainage of this stream.

In the open field a few hundred feet east and southeast of the Sear's spring, there are two others of similar construction. These springs have been piped to the Ingalls spring, but for some time have not been used. The southeast spring is almost east of the Ingalls spring and is not far from the stream flowing by it. The appearance of the field showed that this stream had recently flooded considerable area, and doubtless the spring also.

The above springs and the streams reported flowing near them form the headwaters of Dry brook, which flows through the lower end of the village of Moravia. It has a rather steep bed and its drainage area has been stripped of its forest and during the spring thaws it is subject to floods. During the last week in February, the run-off of this stream was so great as to inundate a large portion of the village of Moravia on February 27 and 28, 1910, and to create considerable damage.

The water from the Sears and Ingalls springs flows through a pipe varying from 3" to 4" in diameter, following the course of Dry brook for about two miles, and thence northwest to the reservoir. At a point about a mile from the reservoir it receives a 2" pipe from the Harris spring.

The Harris spring is located near the Skinner Hill road about one and one-half miles east of the village. It is located on the side of a hill in a slate formation underlying a thin soil layer. Its construction is similar to that of the Sears spring described above. The privy of the Ferro family is about 250 feet east of the spring on higher ground but with surface sloping to one side of the spring. The stable is about 200 feet from the spring on higher ground sloping toward it. About 500 feet from the spring on higher ground is the privy of the Spafford family. The thin surface layer of soil under the privy has been removed and slate rock forms the bottom of the vault. There are five members in this family, all of whom have had "grippe" during the past winter.

The distributing reservoir is located on top of a hill at the eastern edge of the village. It has perpendicular masonry walls and is uncovered. It is 113 x 73 x 12 feet, and is estimated to have a storage capacity of 700,000 gallons, or about a week's supply. From the reservoir the water is brought through a 10" main in Church street to the center of the village and thence is distributed through smaller mains over the larger part of the village.

At times the yield of the springs is insufficient to supply the needs of the village, and at these times the supply is supplemented by pumping water into the mains from a driven well in the northwest part of the village, located about 75 feet south from Cayuga street and about 150 feet west of the railroad tracks.

Two 4" wells have been driven, one to a depth of 42 feet, the other to a depth of 150 feet. The water in each of them rises to within 2 feet of the surface and it has been found necessary to use only one of them (*i. e.*, the one 42 feet deep). The water is pumped directly into the mains by a 6" x 5" x 9" Buffalo duplex steam pump having a suction lift of 4 feet and pumping against a pressure of 90 pounds per square inch.

These wells are located in the flat valley of Owasco inlet, which is subject to more or less flooding. There are a number of houses in the vicinity of the pumping station, the nearest privy being 150 feet distant. The geological formation is chiefly gravel, slate and limestone. The water is very hard and for this reason the above well supply is to be abandoned when the village of Moravia takes over the water works and will be replaced by a new supply from additional springs on which the village authorities have obtained an option.

Samples of water from the various springs and from taps in the village were collected on March 19, 1910, for chemical and bacteriological analyses by the State Hygienic Laboratory. The results of these analyses, together with those of other samples analyzed by the Department during the past two years are given in the accompanying table.

These results show that bacteria of the B. Coli type have at times appeared in samples from both spring and well supplies even in quantities as small as 0.1 c.c. That contamination has been taking place is further substantiated by the chemical analyses, which show the presence of nitrites, high chlorine, and rather high albuminoid ammonia. It is also interesting to note that until the recent set of samples taken on March 19, 1909, B. coli were found present only in the summer and fall months, indicating that direct pollution takes place with a lowering of the ground water level. The analyses of recent samples indicate that surface wash has occurred.

This contamination of the water supply of Moravia it will be shown is a very significant and important factor in connection with the recent epidemic of typhoid fever which occurred in the village where since March 6, 1910, some twenty-seven or more cases have developed. The essential facts concerning these cases are given in the accompanying table:

TABLE SHOWING OCCURRENCE OF TYPHOID FEVER CASES IN VILLAGE OF MORAVIA, WITH ACCOMPANYING INFORMATION FROM AVAILABLE RECORDS

CASE	Age	Occupation	Date of onset	Water supply	Milk supply	Shellfish	Remarks
1	40	Farmer	2/13/10	Well	Own cows	None	Lives in town of Locke on highway leading to and about one-half mile from Dwight Harris' place where the Sears spring is located.
2	56	Propr. store	3/ 6/10	Village supply	Van Etten & Aspell	None	Lived on Church st. Wife had typhoid five years ago.
3	47	Housekeeper	3/ 6/10	Village supply	Van Etten & Aspell	None	Lived on Smith st. Died March 20, 1910.
4	10	School girl	3/10/10	Village supply	Van Etten & Aspell	None	Lives on William st.
5	53	Housekeeper	3/11/10	Village supply	Van Etten & Aspell	None	Lives on Main st. between Cayuga and Church sts.
6	70	Farmer	3/11/10	See (1)	See (1)	See (1)	Father-in-law of (1). Went to village daily after (1) became ill. Other members of family remained at home all the time and none are ill.
7	6	School girl	3/12/10	Village supply	Rose & Wright	None	Lived on North Main st. near West ave.
8	59	Housekeeper	3/12/10	Well	Van Etten & Aspell	None	Lives on Aurora st. Three other cases in same house. See (14), (15),and (23).
9	25	Housekeeper	3/12/10	Village supply	Rose & Wright	None	Lives on West Cayuga st.
10	14	School boy	3/12/10	Village supply	Own cows	None	Lives on Church st.
11	26	Domestic	3/13/10	Village supply	Oakley	None	Lived on Church st. in Health Officer's house.
12	18	School girl	3/13/10	Village supply	Rose & Wright	None	Lived on Congress st.
13	9	School girl	3/15/10	Village supply	Van Etten & Aspell	None	Lived on South Main st. cor. School st.
14	13	School girl	3/16/10	Well	Van Etten & Aspell	None	Lived on Aurora st. Three other cases in same house. See (8), (15) and (23).
15	35	Housekeeper	3/16/10	Well	Van Etten & Aspell	None	Also see (8), (14), (23).
16	18	School girl	3/17/10	Village supply	Own cow	None	Lives on Central st.
17	10	School girl	3/18/10	Village supply	Rose & Wright	None	Lives on Grove st. near Central st.
18	22	Saleslady	3/18/10	Village supply	Rose & Wright	None	Worked in store owned by (2) and where case (23) also worked.
19	32	Housekeeper	3/19/10	Village supply	Rose & Wright	None	Lives on North Main st. near Keeler ave.
20	7	School boy	3/19/10	Village supply	Oakley	None	Lives on Congress st.
21	11	School boy	3/20/10	Village supply	Oakley	None	Lives on Congress st. Brother to case (20).
22	39	Domestic	3/20/10	Village supply	Van Etten & Aspell	None	Lived on Main st. near Congress st.
23	49	Saleslady	3/21/10	Village supply	Rose & Wright	None	Worked in store owned by (2). Lived on Aurora st. in same house as cases (8), (14), and (15).
24	43	Housekeeper	3/26/10	Village supply	Van Etten & Aspell	None	Lived on William st. Mother of case (4) possibly infection by contact.
25	43	Housekeeper	3/26/10	Village supply	Rose & Wright	None	Lives on Central st.
26	9	School boy	3/29/10	Village supply	Own cow	None	Lives on North Main st.
27	41	Housekeeper	....	Well	Oakley	None	Lives on Grove st.
28	19	....	....	Village supply	....	....	Lived on Main st. Now ill at Locke.
29	5	School girl	....	Village supply	....	....	Lived on Church st. Now ill at Syracuse.

In addition to securing the information presented in the above table, a careful inquiry was made as to possible sources of infection such as water supply, milk supply, shell fish, uncooked vegetables, and other factors that might have a bearing upon the cause of the epidemic.

From the data thus collected and also presented in the above table, it appears that the cases are distributed more or less uniformly throughout the village irrespective of class and age. Beginning with March 6, 1910, the date of onset, the cases have occurred almost daily. All but four of the cases have been directly furnished with the village water. Three of these four cases, however, are members of the same household, two being taken ill almost a week after the first case and may have been infected by this case. Of the cases listed twenty-one obtained their milk supply from three dealers, the number of cases being distributed among these dealers in almost direct proportion to the extent of their respective routes.

An inspection of the various dairies was made by our engineer, but nothing was revealed which pointed toward their being a source of typhoid fever, which fact appears to be borne out by the uniform distribution of cases among the dealers and in the village. So far as could be learned, none of the cases had eaten shellfish during the twenty days immediately preceding the onset of illness and only a few had eaten uncooked vegetables during the incubation period. Precautions have been taken to prevent a further spread of the disease and transmission by secondary infection does not seem to have been a factor in the epidemic.

One-half mile north of the Sears spring there are now two cases of typhoid fever in one family (listed in the table as Nos. 1 & 6). The first was taken ill on February 13, 1910. Before this he had been ailing for some time, but had been in the habit of going to the village and elsewhere. The other (case No. 6) was taken ill on March 11, 1910. It is not probable that the drainage from this place could infect the village water supply, and the family does not know where it contracted the disease. These cases are interesting to note, however, since they show that typhoid fever exists on or near the Moravia watershed and it is not improbable that some of the cases referred to as "grippe" on pp. (3) and (5), of this report may have been typhoid fever.

In view of the lack of association of any particular dairy with the epidemic, the insanitary conditions found existing near two of the springs, the presence at times of B. coli in very small quantities of water, the existence of typhoid fever on or near the watershed, the heavy rain and thaw in the last week of February which undoubtedly flooded the springs, and the elimination of other factors there appears to be no doubt that the public water supply has become infected and is responsible for the outbreak of typhoid fever.

It is evident, therefore, that steps should be taken without delay by the village authorities along two lines; first as to the prevention of the further spread of typhoid fever; second, the improvement of the water supply.

As to the first, the boiling of the water should be continued until all sources of pollution have been removed from the watershed and analyses show the water to again be pure and wholesome. A careful supervision and management should be maintained over the dairies from which the village milk and cream supply is obtained, especially as to the sterilization of the bottles, prohibitions against the carrying of milk bottles into houses where typhoid cases exist, and the guarding against, or quarantining, or removal of any persons or employes about the dairies who may have contracted typhoid fever.

It is further important to see that all precautions are taken in the care of patients suffering with the disease with respect to isolation, disinfection of urine, stools, bedding, dishes, etc., and such other measures as will prevent a spread of the disease from these foci of infection. Not only are these precautions necessary to protect the health of the people of the village of Moravia but also to prevent infection of Owasca Lake which is being used by the city of Auburn as a source of water supply.

As to measures which should be taken looking toward the improvement of the water supply, it appears that the supply from Sears and Ingalls springs can be made safe by protecting these springs from surface wash by properly

enclosing them in man-holes with heavy iron covers on locks, the tops of which shall extend well above high water mark. It is important, moreover, that sources of pollution near them shall be removed as far as possible, particularly the privy near the Sears spring, which should be provided with a water-tight removable box which should be cleaned regularly. A cesspool located down stream from the spring should also be proyided to care for the liquid wastes from this place. Owing to the fact, however, that the springs are located in a slate formation, this cesspool should be water tight. It would also be wise to observe similar precautions at the Lovelace place.

In regard to the spring located on the Skinner Hill road, a further study should be made of its sanitary condition. While the data at hand is not sufficient to definitely draw conclusions as to its sanitary quality, it nevertheless opens it to suspicion. The analysis shows the presence of B. Coli at the present time. The spring is located in a slate rock formation and 250 feet and 500 feet, respectively, distant from two privies, the latter of which has a vault extending down into the rock and which during the past winter has received the excrement of a family, five of whom have been ill with "grippe" during the past winter. Furthermore, analyses of samples of the village water taken in the summer and in the fall of the year show the presence of B. Coli in 1 c.c. samples, and from the conditions observed on the watershed it would appear that contamination might have come from this spring.

In connection with the improvement of these springs attention should be called to the proposed plan of developing an additional supply by securing other springs as referred to above. The investigation did not extend to the proposed additional source of supply since the quality of the present supply and its relation to the outbreak of typhoid fever was the only matter under consideration and the Department has not facilities nor funds to make such a study. The village should, therefore, retain the services of an expert sanitary engineer or water analyst to advise them as to the sanitary quality of the water from the springs under consideration before taking steps to connect them with the water works.

In view of the foregoing, I, therefore, beg to recommend that a copy of this report be transmitted to the local board of health and the board of trustees and that they be advised that:

1. Precautionary measures should be taken by them with reference to the outbreak of typhoid fever, such as a careful supervision of the milk supply as is outlined in the foregoing report, the proper care and isolation of patients, the disinfection of urine, stools, bedding, dishes, etc., and such other measures as will prevent a further spread of the disease and the pollution of the streams and water supply of the city of Auburn.
2. Until the present water supply is made safe, or a new supply developed, the boiling of the water should be continued.
3. They should proceed at once to thoroughly protect the Sears and Ingalls springs from surface pollution, and to remove all sources of contamination of the watershed.
4. Owing to local conditions surrounding the spring near Skinner Mill road, this spring should be abandoned unless further study by an expert shows that it can be protected from pollution.
5. In the selection of an additional supply a careful study should be made to insure that such supply from springs or other sources is free from contamination.

It is my opinion, that if steps are taken by the village authorities, in accordance with the recommendations contained in the above report, that the cause for the recent outbreak of typhoid fever will be removed and a purer supply of water will be secured, which will prevent a further outbreak from the water supply.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

QUARRYVILLE (Town of Saugerties)

ALBANY, N. Y., *November* 1, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation made at Quarryville, Ulster county, of an outbreak of typhoid fever which occurred there this summer. On October 20th, Mr. Fritz M. Arnolt, Inspecting Engineer with this Department, accompanied by J. A. DeWitt, M.D., health officer of the town of Saugerties, visited Quarryville and made an investigation there with regard to the probable origin and the means by which the fever was spread.

Quarryville is a small hamlet in the town of Saugerties, having a population of about 200. As its name indicates, its principal industry is its quarries from which blue stone, curbing and flagging are taken. During the past summer, beginning with the first week in July and extending until the last week in September, at least ten cases of typhoid fever occurred. These cases appeared gradually one after another in different parts of the hamlet in about the following order, the approximate dates of onset being given first:

July 7th. Mrs. James Schoonmaker. Water was taken from a well opposite. This well was, and is, used by several other families. Milk supply from Well's farm.

July 13th. Mr. James Schoonmaker, husband of above person.

July 18th. Two years and eight months old child of Mrs. Charles McLaughlin. Water obtained from Taylor's well, next door. This well is used by several other families. Milk supply from Well's farm.

July 27th. Mrs. Fitzpatrick. Recovered from typhoid fever, but died subsequently from operation for removal of abdominal tumor. No data.

July 29th. T. R. Rooney. Keeps saloon with brother. Saloon is opposite Charles McLaughlin's place. Water obtained from well on property. Milk supply from Well's farm and Monroe's.

August 5th. J. R. Rooney, brother of T. R. Rooney. Keeps saloon with him.

August 5th. Michael Orouke. Teamster working in quarry. Water supply obtained from well on property. Milk from Monroe's and Well's.

August 10th. Mrs. Valkenberg. Water supply obtained from well on premises. No milk used until she was taken sick.

September 6th. Isabella Ribsamen. Ten years old. Had been in poor health all summer. Water supply obtained from well next door. Milk supply also from neighbor next door.

September 25th. Mrs. James Cook. Water obtained from same well used by Schoonmaker. Milk obtained from Well's farm. This place is adjacent to J. Schoonmaker's.

No positive information as to the origin of the outbreak could be obtained. In regard to the general conditions which exist in the village it may be said, in the first place, that no very extensive quarrying is carried on at present, and that very little real intercourse with the outlying towns is held. Again, it may be said that no summer people or outside residents were in the habit of visiting the place. The conclusion can only be reached, therefore, that the first case was brought in by a transient, or that some local person had so light an attack that it was not recognized.

In so small a community the spreading of the outbreak by contact is a very general agent. There can be no doubt that Mr. Schoonmaker contracted the fever by direct contact infection. Although seven days elapsed between the onset of Mr. T. R. Rooney and Mr. J. R. Rooney it is not probable that

J. R. Rooney contracted the fever from his brother, but more likely that both of them became infected at the same time and from the same sources. Although Mr. J. R. Rooney did not take to his bed until seven days later than his brother he was sick several days before taking to his bed. In several other instances circumstances point to contact infection, although the persons who contracted the fever do not appear willing to admit such. It is very probable, however, that contact infection played its proportionate share in spreading the fever.

A glance at the articles of food common to all cases immediately brings out that, with two exceptions only, milk obtained from Well's farm was common to the persons who had contracted the fever; but the outbreak was not characteristic of a milk outbreak which, as a rule, is of a sudden and violent nature. This outbreak was gradual and extended over a period of almost three months. Milk through the means of contact infection may have played its part.

The water supply immediately arouses suspicion. This supply is obtained from wells. Some of these are driven wells, but all are comparatively shallow. The cases of fever mentioned are located in different parts of the town and in the ten cases reported at least six different wells contributed to the water supply. The persons who contracted the fever all stated that they had obtained no water from any other well except the one that they regularly use. These wells, however, are located in a rock country. They probably all have underground connections with each other and with the quarry pits by means of cracks, faults and crevices. The well used by the Schoonmakers and several other persons in the vicinity is about 150 feet from an abandoned quarry pit which is filled with water. This is about at the same elevation as the well. A few feet from the water's edge is a privy in back of a house tenanted by Mr. Hallenbeck. This privy is full and the contents are washed into the quarry pit. This case points out the dangers in using such a well in a region like Quarryville, as water passing through rock material receives practically no filtration and purification.

Most of the villagers have their own truck gardens supplying their vegetables. They do not use shellfish to any extent, as these are difficult to obtain and expensive. They do not ordinarily use ice but cool their milk and other articles of food by suspending them in the wells.

A very probable cause in spreading the infection is through the agency of flies. The fly is a common carrier of infection when infected material is accessible, and is consequently an important agent in the spreading of summer and autumnal typhoid. It is common knowledge at Quarryville that physicians' orders, in regard to the proper disposal of fecal discharges, were not rigidly carried out, and that some of the fecal discharges were carelessly thrown in shallow pits, covered loosely with boards and more or less accessible to flies, or not covered at all. It is very probable that flies may have played a very important part in the spreading of this outbreak.

The suspicion that the water in the quarry pits was responsible for the outbreak of typhoid has no very definite foundation. The water in itself unless infected cannot spread the fever. The water filling these pits comes from springs. The quarries that are being worked are pumped out regularly. The others, however, are filled with stagnant water whose surface is filled with a heavy matting of algae growth. The rock in this region contains faults, cracks and crevices, and there are probably connections through these between the different quarry pits and even between the wells and pits. Privies are located close to these quarries and some of them are in an extremely insanitary condition, the contents finding their way into the water and polluting it. No evidence could be obtained that the water in the quarries was ever used for drinking purposes; but the probability that some of these pits have connections by means of cracks and faults with some of the wells leads to serious thought of danger of infecting the wells.

It must appear that the outbreak is one in which no conclusive evidence as to one specific cause could be determined; but, on the contrary, that there are several factors, as pointed out before, which contributed to the spread of the outbreak. These should receive attention at once and measures taken to remedy them. For instance, care should be exercised to see that all cans or receptacles into which milk is placed and kept should be thoroughly cleaned and sterilized by scalding with boiling water or steam. Such receptacles when in use should always be kept covered to prevent the access of flies.

Again, many of the privies are in a very insanitary condition, with the contents overflowing or leaching out. This constitutes a serious public nuisance, for the privies may at any time become a source of infection in polluting well water, or through the agency of flies transmitting infectious material to food. They should be thoroughly cleaned out and the vaults made tight to prevent the contents from leaching out and also to prevent the access of flies. All windows should be screened to keep out flies.

Finally, the water supply must be viewed with considerable apprehension as to its purity. This matter is rather a serious one from a practical standpoint, considering that the residents now rely upon a series of individual wells for their supply. Although the more shallow wells might be abandoned and only the deeper driven wells used, it is very probable that on account of the widely scattered nature of the pollution and to the particular geological formation found in this section, none of the present wells can be considered permanently safe not without the danger of at some time becoming infected. It would be much safer to abandon all of them, if possible, and secure some other public supply of unquestioned purity.

As a result of this investigation, and in view of the facts and information presented above, I am of the opinion that the cause of this epidemic cannot be traced definitely to any one particular source, but is the result of a number of conditions and factors which have worked cumulatively to account for the spread of the disease from the first one or two cases which occurred. These conditions or factors relate more especially to the milk and water supply and agencies of secondary infection, including dissemination through the medium of flies, and in order that these factors or influences may be suppressed and a further prevalence of the disease checked, I beg to recommend:

1. That every precaution be taken in the care of patients and in the disinfection of excreta, and so prevent the spread of infection through this channel.
2. That a careful guard or supervision be kept of the source of milk supply and its distribution, especially its distribution to families where typhoid fever cases exist, to prevent an infection of the supply and a spread of the disease through this channel of infection. Particular attention should be given to the sterilization of all cans and bottles in the distribution of milk.
3. That all insanitary privies be cleaned and that they be protected, so far as possible, against flies by screening.
4. That screening of doors and windows of all houses be encouraged so far as possible.
5. That all shallow open wells be abandoned in favor of deeper drilled wells and, if possible, all wells be abandoned in favor of a public supply secured from some unquestionably pure source.

In conclusion, I should beg to recommend that a copy of this report be sent to the health officer of the town of Saugerties, and that he be advised to recommend such action by his board as will result in carrying out the recommendations given above, as far as it is possible.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ROUSES POINT

See Special Investigation of Public Water Supplies, page 576.

SYRACUSE

See Investigations Ordered by the Governor, page 662.

SYRACUSE STATE INSTITUTION FOR FEEBLE-MINDED CHILDREN

ALBANY, N. Y., *September* 16, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report that, in accordance with your direction, I visited on September 13th the Syracuse State Institution for Feeble-Minded Children, and by appointment conferred with Dr. J. C. Carson, superintendent, and his assistant medical officer, concerning the prevalence of typhoid fever at the institution and the sanitary conditions thereof.

I found that between August 12 and September 12, 1910, there occurred 8 or 9 cases of typhoid fever, but that at the time of my visit there was no indication that the prevalence of this disease was on the increase. This typhoid rate for one month, with the population of 650 in the institution (including the farm containing 40 hands), corresponds to a yearly mortality of about 150 per hundred thousand. In other words, taking this maximum month, it would appear that typhoid fever is some three or four times the normal, although it is no greater than what the cities of Chicago, Pittsburg and Philadelphia put up with uncomplainingly for years. It being above the normal, however, it is a matter of concern, and one which should be thoroughly looked after and eradicated. It should not be lost sight of, however, that these 8 cases represented the only cases of the year, and that the yearly mortality on this basis would be little, if any, above the ordinary mortality of the State.

In order to find out the cause for this prevalence of the fever I inquired carefully into the sanitary conditions of the institution, and found that the water supply of the main institution is from the Syracuse public supply and, although there is considerable typhoid fever in the city, according to the statement of Doctor Totman, whom I telephoned, it would hardly seem that this prevalence could be attributed to the water supply.

I found that the sewerage conditions were unsatisfactory since the sewage was discharged into a small stream, which flows only 500 feet from the main buildings and where I found the sewer outfalls insanitary, there being fecal and sewage matters spread around the vicinity of the few outlets of this creek.

I found that the milk supply was secured from the farm, situated some few miles distant, and I drove with Doctor Carson and inspected the conditions of the farm and found a driven well supply which, so far as the natural quality was concerned, should be comparatively pure, it being a driven well sunk some 125 feet into the soil. One or two old wells were found on the place, but it was declared that these were not used for drinking purposes at any time or for other purposes than washing carriages.

I found that the milk supply was handled according to modern methods, the cans all being thoroughly washed and sterilized in a steam sterilizer, the water cooled by an ice cooler and properly stored in a refrigerator.

I found that the cattle were all carefully washed and wiped off carefully

before milking, and it was claimed that the milk man's hands were washed before milking. The stable had a concrete floor and everything appeared sanitary. Screens were freely used, although I found a number of flies in the stable and in the milk room.

At the main well, which is pumped by a wind mill, I found that the tenants were in the habit of drawing water for drinking purposes from this well by hand, and that they stood on a platform which was loose plank, and it was evident that there was an opportunity for contamination from the feet to pass directly down into the well and around the pipe, and possibly get down into the water. The soil was partially gravel and it was very possible that a small channel might be formed along the pipe which would permit the polluted water to sink down and be pumped out again.

A very important observation was the fact that the pail system of removal of excreta was in use, and this privy was within 150 feet of the milk barn and receiving room, although this privy was in a sanitary condition for a farm privy and under the circumstances of this method of disposal of the excreta and, although disinfectants were used, it was evident from my inspection that the method was insanitary and there was ample opportunity for flies to carry excretal matter from this privy across to the milking operations.

When it is considered that the typhoid fever is not epidemic, but is merely unduly prevalent for this season of the year, and when we consider that the cause for it must not be a prominent one, it is my opinion that three factors are mainly responsible for the disease, namely, the insanitary sewerage conditions at the institution, the pail system of removal of excreta, with its accompaniment of fly transmission and possible infection of the well water due to surface pollution from persons who draw drinking water from the well. These factors might be emphasized when we consider that the institution is one for feeble-minded, and that the personal habits of the inmates could hardly be expected to be equal to those of perfectly sane people.

In view of the foregoing it would seem that efforts should be made at once: First, to secure a satisfactory method of collection and disposal of sewage of the main institution in the city, and this I understand is in prospect, through the extension of the Syracuse system of sewers to intercept the institution sewage; second, to abolish the can system of collection of excreta and substitute for it a proper system of sewage collection and disposal for the entire farm buildings; third, a prohibition against the drawing of water by hand at the main well, thus removing the surface pollution from such operations.

Until these three possible sources of infection are removed, I do not see that there can be any hope to entirely eradicate the disease of typhoid fever from the institution, and I would recommend that a copy of this report be sent to the proper authorities for suitable action.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

WILLARD STATE HOSPITAL

ALBANY, N. Y., *September* 30, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to report that in accordance with your directions I visited the State Hospital for the Insane, at Willard, and made an inquiry into the recent outbreak of typhoid fever at this institution, and an investigation of the sanitary conditions of the institution in connection therewith.

The Willard State Hospital is situated on the east shore of Seneca lake, about midway of its length, and some 15 miles south of the outlet and of the city of Geneva. The lands comprise some 1,200 to 1,500 acres used for

institution building and for farming purposes. The census at the time of my visit showed 1,165 male and 1,224 female inmates, which, with some 500 attendants, makes a total of approximately 3,000 persons.

It was learned that although epidemics of diphtheria of more or less magnitude have occurred during past years, the institution has, up to the present year, been comparatively free from prevalence of typhoid fever. During this year, however, beginning with about August 1st and continuing for six or seven weeks, there have occurred some 25 cases of typhoid fever, practically all verified by Widal tests. This outbreak followed a normal course, reaching a maximum, diminishing, and at the time of my visit had practically disappeared. The cases were apparently not confined to any specific building nor class of inmates or attendants, and the outbreak was apparently not explosive but slow and progressive. These 25 cases occurring in some two months' time, at this season, correspond, with proper allowance for seasonal distribution, approximately to a mortality rate of about 300 per 100,000, or some ten times a reasonable normal.

To inquire into the probable source of this infection I conferred with the superintendent, Doctor Elliott, and his assistant physician, and made a careful inspection of the grounds, water supply, sewerage, and milk and food supplies, in company with the steward and the chief engineer of the institution.

The institution is provided with a water supply taken from the lake through an intake pipe, extending some 1,300 feet northwest from shore opposite northerly end of the grounds, the intake being approximately 1,000 feet from shore. The water is pumped at pumping station, situated close to shore, to a masonry reservoir holding some 3,000,000 gallons, situated at an elevation of some 160 feet above lake near the middle of the institution grounds. This reservoir supplies low service system, a high service system being maintained by direct pumping at station near reservoir, for buildings at higher elevation than reservoir. An elevated tank to connect with this high service is in process of construction at Grand View, the highest summit on the institution grounds.

The institution is provided with a sewerage system, constructed many years ago and, so far as could be learned from plans and inquiries, is largely on the "separate" plan, though rain water from roofs and other areas enter the system. The outfall of the main system of sewers discharges into the lake in front of the institution, some 200 feet from shore and in shallow water. In addition to this main outfall sewer, serving most of the buildings, there are some four or five other sewers serving individual buildings, which discharge into the lake near the shore line at various points along the water front, one or two being not far distant from water intake line.

Although a careful inspection of the unusual, if not startling conditions which were found to exist in connection with the method of disposing of sewage into the lake almost directly opposite the front of intake and source of the institution water supply, would incline one not to seek further for a possible or probable source of typhoid fever infection in the recent outbreak, or the occurrence of the disease at other times, I made a careful inspection of the source of milk supply and method of handling it, since this factor is always an important one, not only in connection with a specific outbreak of this disease and other diseases, but as a general safeguard against infection, even when other important matters such as water supply and sewage disposal are satisfactorily attended to.

The milk supply is secured from a herd of Holstein cows owned by the institution and kept and milked in two barns at the easterly portion of the institution grounds. Some 1,500 quarts of milk are consumed daily, milked by a force of 15 milkmen, practically all of whom are inmates selected from among the more intelligent class, and who, it is claimed, are required to wash their hands before milking. The milk is not cooled but is shipped at once to the different buildings in cans holding about 40 gallons, each building having and caring for its own cans. The cans, after using, are at once cleaned at the building, set in the open, and later collected and returned to milk house, a building used for washing pails, receiving and sending out milk cans, and provided with a hot water heater. No sterilizing of cans is

practiced, though it is claimed that they are all rinsed with hot water. The milk house is provided with screens, but notwithstanding this flies were in abundance in the milk house, as were they also in the stable and receiving room at the barn.

The stables, where the cows are fed and milked, are of modern construction, provided with masonry floors and cleaning and flushing devices. They were generally clean but open to objection of considerable manure spattering on the walls, and due, in my opinion, partly to defective construction of gutters. The manure is stored in the yard and carted away at intervals of ten days to two weeks and used as fertilizer.

Two privies are maintained in connection with the two barns which are insanitary as to construction, protection and disposal of excreta, which is thrown in with manure, exposed to flies and used for fertilizing fields. These open privies should be abandoned and new ones of proper construction provided, properly screened, and the contents of them disposed of by burial in trenches. It would be much better, if practicable, to provide a washroom and inside closets and connect them with sewerage system.

In reaching a conclusion as to the cause of the recent outbreak and of prior occurrences of typhoid fever and probably of other epidemics which the institution has suffered from one does not have to consider, except very generally any other factors than those presented by the condition of the water supply and sewage disposal of the institution. These so overshadow any others having a bearing on the question that one may temporarily ignore them.

A water intake situated in such close proximity to a series of sewer outlets as that existing at Willard, where opportunity is given for a free and easy conveyance of sewage matters from these sewer outlets to the water intake, under transporting power of surface currents and waves, induced by wind action, creates a picture so clear and so emphatic in its meaning and importance as to leave no room for argument or for doubt as to its great danger, nor for any delay in taking measures to correct them. The most surprising fact is that a greater prevalence or more outbreaks of typhoid and other diseases have not occurred at the institution, and, in my opinion, this can only be accounted for by the great dilution that takes place, and the good fortune of not having disease germs present in great numbers during the times when sewage has been carried by waves and surface currents from the sewer outlets to the water intake. It would certainly be a dangerous precedent now, in the face of these facts, to rely on such chance influences as a source of immunity from typhoid fever and other infectious diseases.

In view of the facts set forth above it is my opinion that, whereas there are certain factors outside of the questions of water supply and sewage disposal which on general grounds should receive the attention of the institution authorities, and to which allusion will be later made, the principal source of infection which has occurred during the recent outbreak of typhoid fever, and which may have been an important feature in the outbreaks of other diseases which have occurred at the institution during the past years, has been a contamination of the water supply by the sewage of the institution discharged in relatively close proximity to the intake; and I beg, therefore, to recommend the following modifications and extensions be made in the water and sewerage systems and methods of sewage disposal:

1. That a new water supply intake be constructed with location some half mile or more south of the institution, extending sufficiently out into the lake to insure a depth below the line of wave action and superficial lake currents.
2. That a water purification plant be installed to properly filter the water supply secured as above.
3. That all of the sewers leading from the institution buildings be intercepted by an intercepting sewer and carried to a suitable point of sewage disposal on the lake front at the northerly end of the institution grounds.
4. That all surface or storm water be diverted from all sewers carrying domestic sewage, and be led in other conduits independently to the lake or the nearest streams tributary thereto.

5. That a sewage disposal plant be installed to partially or completely purify (or disinfect) the sanitary sewage before it is discharged into the lake.

The question of exact location of water intake, location of sand filters, route for an intercepting sewer and exact location and type of sewage disposal plant and outfall cannot be determined without a more careful study of local conditions and topography. That the changes and arrangements above referred to can be readily determined from an engineering standpoint, I have little doubt, and the general project above outlined should be referred to the State Architect or some consulting engineer employed by the institution authorities for solution of details and preparation of plans which, in accordance with the statutes covering these matters, should be referred to and approved by this Department before construction is begun.

While the above important matters should not be overshadowed by reference to other important, though less essential changes, which should be carried out in order to place the condition and management of the institution on a more thorough sanitary basis, I wish to make the following recommendations with reference to improving the conditions surrounding the source and handling of the milk supply, believing that they are essential to the further protection of the health of the institution and that they can be carried out with comparatively little expense:

1. That a steam sterilizer be installed for a thorough sterilization of all milk cans and utensils used in the collection and shipping of milk to the various institution buildings.
2. That cooling apparatus be installed for purpose of cooling milk as soon as it is drawn.
3. That more thorough screening of windows, doors and other openings be provided at the barns and milk house.
4. That the open and otherwise insanitary privies at the barn be abolished and that suitable closets and lavatories, connected with the sewer system, be installed at the barns for the enforced use of milkmen and stablemen and for providing enforced washing of hands preliminary to milking operations.

I am of the opinion that unless the improvements and changes as above recommended are carried out there will continue to exist sources of danger or menace to the health of inmates and attendants at the institution; and I would suggest that a copy of this report be transmitted to the State Board of Lunacy and the superintendent of the institution for their consideration and suitable action, to the end that the above recommendations may be carried into effect with as little delay as possible.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

YONKERS

ALBANY, N. Y., *October* 17, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your request I beg to submit the following report of an investigation of the sanitary condition of the public water supply of the city of Yonkers. This investigation and report was called for with special reference to any relation which might exist between the condition of the supply and the continued presence or prevalence of typhoid fever in the city.

For the purpose of this investigation Yonkers was visited and inspections were made by the writer, as Chief Engineer, and Mr. Holmquist, Assistant Engineer, of the sanitary condition of the watersheds of the two main sources of supply, the quality and condition of the water in the storage reservoirs of

the Grassy Sprain supply, and the condition and efficiency of the slow sand filters used in connection with the Saw Mill or Nepperhan river supply. To supplement the findings of these inspections chemical analyses have been made by the Laboratory division.

The report of Mr. Holmquist of the results of his inspections of the watersheds of the Saw Mill river and of the Sprain and Grassy Sprain rivers, accompanies and forms a part of this report. The results of a laboratory analysis of river water and filter effluents is also appended herewith, while the results of the inspections of the writer will be referred to in the body of the report.

Without giving a detailed description of the water supply system of the city of Yonkers it may be said in general that the supply is taken from two main sources; one from the Saw Mill river and the other from the combined catchment areas of the Sprain and Grassy Sprain rivers which flow into the Grassy Sprain reservoir. The Sprain and the Grassy Sprain supplies which are impounded in their reservoir, holding some eight or nine hundred million gallons, is distributed to the city through low and high surface pressure systems without filtration. The Saw Mill river supply, however, is filtered at a filtration plant located just north of the city where are located two old and two new slow gravity sand filters, the water after filtration being pumped directly into the mains and to a distributing reservoir.

Since the waters in both of these main sources of supply are surface supplies, and since one of them is filtered, and the other is not, the question of the sanitary condition upon these catchment areas is a very important matter and it was for this reason that a careful survey was made by our Assistant Engineer to determine what pollution, if any, entered the watercourses of these two main sources of supply. The report of Mr. Holmquist shows very clearly and with marked contrast the sanitary conditions on these two watersheds.

It will be seen from the accompanying report that there was found to be little, if any, appreciable pollution upon the watershed and around the reservoirs of the Sprain and Grassy Sprain supply. In other words, the sanitary patrol of this watershed was found to be good, and aside from its limited quantity no special criticism can be made of it at the present time.

With reference to the Saw Mill river, however, I find a marked contrast as to the conditions upon the watershed. This river drains a territory, a large part of which is without the jurisdiction of the city of Yonkers and very little of which is controlled either by purchase or easements by the city of Yonkers. This watershed, as well as that of the Grassy and Grassy Sprain supplies is protected by rules and regulations enacted by this Department, but notwithstanding these rules, which would enable the city of Yonkers to prevent and remove any pollution that may exist upon the watershed, there were found some ninety violations.

Attention should be called at this time to the significance of these rules and regulations and of the failure of the city of Yonkers to correct any violations, as well as to the repeated efforts made by this Department to induce the city officials to have these violations removed in accordance with the procedure laid down in the Public Health Law.

In 1908 this Department called for a special inspection and report from the Yonkers water board as to the condition upon the watershed and as to the existence of any violations of the water rules protecting the supply. This inspection resulted in the discovery of some sixty or more violations of the water rules and, after they were duly reported to the Department, orders were issued by the State Commissioner of Health upon the local boards of health for the abatement of these violations. At this time the water board was thoroughly advised as to the procedure under the rules and regulations which should be followed in the abatement of these violations and it was particularly pointed out to them that the final action and responsibility in the abatement of these violations rested with the water board which, under section 72 of the Public Health Law, requires that adequate compensation must be made by the city in cases of all permanent changes or damages occasioned by the enforcement of the rules.

The matter of violations was again taken up with the city in June, 1909, when the commissioner of public works was again advised that further action

in the abatement of these violations devolved upon the board of public works, again pointing out the procedure for the board to take in the cases which up to that time had not been removed and advising him that the board of water commissioners had a right to maintain action against all violations cited in the orders sent to the local boards of health, copies of which had been previously sent to the water board.

It appears then from the accompanying report of Mr. Holmquist, and notwithstanding the previous advices to the water board, that of the 81 cases of violations verified by the Department inspection in January, 1909, 52 of these cases still remain uncorrected and 29 have been only partially abated; and that, whereas, 6 cases have been entirely abated, 10 new cases of violations were discovered, making a total of 91 violations still existing on the Saw Mill river watershed, an increase rather than decrease in the number of violations of the water rules.

In view of this existing pollution upon the Saw Mill river watershed and of the failure of the city to cope with it, notwithstanding rules and regulations which give it ample power and authority to remove any violations, the question of efficiency of the filter beds is a very important matter, and a very careful inspection was made of these filters by the Chief Engineer during his inspection on October 3, 1910. These filters are four in number, two old ones constructed some ten years ago, and two new ones constructed some year or more ago and put in operation last January or February.

The older filters are apparently substantially constructed and, though not of the most modern, are still of good design and, if properly maintained and operated, should give a satisfactory efficiency in the removal of bacteria. The new filters are of more modern and improved design and should give even a higher degree of efficiency than the older ones. As a matter of fact, however, neither of these filters give a high or a satisfactory efficiency of bacterial removal and, what would appear to be an inconsistency, the new filters show a less efficiency than the old ones. These general facts were learned not only from the records of Doctor Horne, the resident chemist, but were proven more clearly by the recent laboratory analyses made by the Laboratory division of this Department. The results are appended herewith and show that the efficiency of both such filters to be not only very low, but that the effluent from each at the time of the collection of the last samples was unsatisfactory and unsafe.

The reason for the unsatisfactory operation of these filters was readily accounted for from investigation of the method of operation of these filters. In the first place the equipment of the new filters was not all in operation; that is, the rate measuring and loss-of-head gauges, which are necessary to determine the rate of filtration and the loss of head of the water passing through the filters, were not in use, and the apparatus had evidently been abandoned. The filters were not being operated uniformly and at certain times of the day were not being operated at all, the result of which was to cause a nonuniform rate of filtration which is not conducive to good efficiency of these filters. Still further, it was found that in order to correct the apparent low efficiency of these filters, especially the new ones, "hypochlorite" treatment was being practiced, and this was being done in a very crude and inefficient and fundamentally wrong manner. That is, it was found that the hypochlorite was being added to the water before filtration, which would tend to destroy the biological action of this filter by killing the "schmutzdecke" or biological surface film upon which depends the bacterial efficiency of slow sand filters of this type. It was also found that the hypochlorite was being mixed in ordinary barrels and applied through ordinary spigots for measuring, a very crude and inefficient, if not precarious, manner of applying a solution of this kind for the purpose intended. If hypochlorite is to be used as a disinfecting agent it should be applied to the effluent from the filters and not to the water before passing through the filters, and it should be applied with a definite strength at a uniform rate proportional to the amount of water and in such manner as to be thoroughly mixed with the water.

It could hardly be expected, from the method of operation as above described, that the new filters should show any high degree of purification and, considering the high pollution of the raw water, it is evident that these filters

are giving very little protection to the citizens of Yonkers against the dangers of this pollution. The fact that hypochlorite was not being added to the raw water which is applied to the old filters probably accounts for the general higher efficiency of these old filters, and were it not for the cleaning and removal of sand which had taken place just prior to the collection of the last samples from these filters it is probable that the results would have shown a higher absolute and a much higher relative efficiency than the new filters.

After reviewing carefully the conditions which have been found to exist upon the watershed of the Saw Mill river, and of the inefficient method and results of operating the filters, I am of the opinion that the portion of the water supply of the city of Yonkers that is now taken and treated from the Saw Mill river is unsafe. It is true that the water supplied from this river furnishes at the present time only two or three of the eight or nine million gallons daily water consumption of the city, and it is probably due to the relatively small proportion of this inadequately purified water consumed by the citizens that accounts for the relative absence or infrequency of any serious prevalence or epidemic of communicable diseases.

In connection with the conditions which exist upon the Saw Mill river watershed reference should be made to the sewage disposal plant of the Westchester Almshouse, at East View, which appeared to be the only sewage disposal plant or means of sewage disposal on the watershed not operating satisfactorily, from which sewage pollution was being discharged directly into the river. This plant, as pointed out at length in the accompanying report of Mr. Holmquist, was found to be neither constructed in strict accordance with the plans approved by this Department, nor operated in accordance with the conditions of the permit issued at the time of the approval of the plans; and as a result the effluent from the plant did not show a high or a proper degree of purification. It is true that this plant is located some ten miles above the intake of the Yonkers water supply, but notwithstanding this the purity of the effluent was insufficient to be discharged into a stream of such small volume when used as a source of water supply, and notwithstanding the fact that this water is filtered, for as pointed out above, the efficiency of this filtration is inadequate at the present time.

It should be pointed out also, in connection with this plant, that under the Public Health Law and in accordance with the rules and regulations for the protection of this supply it was primarily the duty of the water board and the local board of health to ascertain the compliance of the construction and operation of this plant, with the permit issued to the authorities of the county almshouse, in order that action might be taken by this Department to demand a proper operation of this plant in accordance with the conditions of the permits issued, or to revoke the permit. In view of the present failure of the county almshouse authorities to operate this plant in a satisfactory manner, I beg to recommend that the matter be taken up with them and that they be required to make such improvements in the construction and operation of this plant as will produce a satisfactory effluent, or if they fail to do this that the permit be revoked.

That action should be taken at once by the water company looking, not only to the removal of the large number of violations of water rules cited in the accompanying report of Mr. Holmquist, but to making such changes and improvements in operation of the filter beds, there can be no question. I, therefore, recommend that copies of these reports be transmitted to the water board and that they be again urged to take action without delay in removing the violations upon the watersheds of their supply, and to make the necessary improvements and changes in the management and operation of their filters as will result in a higher degree of efficiency.

It is my opinion that unless these measures are carried out the citizens of Yonkers will continue to be subject to an undue prevalence of typhoid fever, and possibly of recurrent epidemics such as appeared to be started, but fortunately were checked, during the early part of the present year.

Respectfully yours,

THEODORE HORTON,

Chief Engineer

ANALYTICAL DATA OF WATER SUPPLIES

Results in Parts Per Million

SUPPLY FOR THE CITY OF YONKERS FROM JANUARY 11 TO AUGUST 3, 1910

SOURCE	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present, − = Absent) 10 c. c.	1 c. c.	
Raw water—Nepperhan River	1/11/10	....	....	....	....	....	....	....	....	....	....	....	....	14,500	+	+	
Effluent filter, unit No. 3	1/11/10	....	....	....	....	....	....	....	....	....	....	....	....	3,200	+	−	
Effluent filter, unit No. 4	1/11/10	....	....	....	....	....	....	....	....	....	....	....	....	....	+	+	
Raw water	8/ 3/10	5	12	155	121	.016	.134	.004	0.20	6.5	120.	89.00	1.90	25,000	+	+	
Filter No. 4—Chlorinated and Filtered	8/ 3/10	....	....	....	....	....	....	....	....	6.5	....	....	....	1,500	+	+	
FROM AUGUST 3 TO OCTOBER 6, 1910																	
Raw water	10/ 6/10	30	5	123	78	.100	.226	.006	0.04	5.50	77.1	76.	4.00	7,400	+	+	+
Unit No. 1	10/ 6/10	....	....	....	....	....	....	....	....	....	....	....	....	700	+	+	+
Unit No. 2	10/ 6/10	....	....	....	....	....	....	....	....	....	....	....	....	650	+	+	+
Unit No. 3	10/ 6/10	5	Trace..	125	89	.018	.096	.003	0.24	6.50	88.6	88.	1.86	375	+	+	+
Unit No. 4	10/ 6/10	....	....	....	....	....	....	....	....	....	....	....	....	700	+	+	+

ALBANY, N. Y., *October* 11, 1910.

THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report that in accordance with your instructions I made an inspection to determine the violations of rules for the protection from contamination of the public water supply of the city of Yonkers on October 7 and 8, 1910. The entire watershed of the Nepperhan river was covered in the inspection. While it was impossible for me to cover in detail the watersheds of the Grassy Sprain and the Sprain brooks in an inspection of this kind, these watersheds were generally inspected but no violations were found on these streams, and it was stated by the officials of the water bureau that no violations exist on these two watersheds.

The impounding reservoir on the Grassy Sprain has a capacity of 900,000,000 gallons. At the time of the inspection the water in this reservoir was very low, there having been practically no rainfall for a period of forty-nine days, and it was estimated by the superintendent of the water bureau that about 200,000,000 gallons were available, equivalent to about thirty days' supply.

The records of the Department show that on December 8, 1908, some eighty cases of violations were reported to this Department by the commissioner of public works of Yonkers in accordance with section 71 of the Public Health Law. These violations were examined into by the Department on January 4–6, 1909, inclusive, and of the number reported, 81 were verified, 4 had been abated and in 2 cases no violations existed. On January 23, 1909, orders were sent to the local boards of health having jurisdiction, directing them to take definite action in the matter of abating the eighty-one cases of violation examined into and verified by this Department, and copies of these orders were also sent to the commissioner of public works.

Under date of May 28, 1909, a report was received by the Department from the commissioner of public works of Yonkers which showed that 69 violations had not been abated up to that time and that 6 additional cases had been found, making a total of 75 cases of violations existing at that time.

These six new violations were examined into by this Department on June 7, 1909. One of these cases had been verified on the previous inspection made on January 4–6, 1908, inclusive, and order issued on January 23, 1909; the other five cases were verified and orders issued to the local boards of health having jurisdiction directing them to take immediate action in the matter of abating the conditions set forth in the orders.

The commissioner of public works of the city of Yonkers was notified on June 1, 1909, that in regard to the old violations, this Department had taken all the action required of it under the provisions of sections 71 and 73 of the Consolidated Laws (the Public Health Law), and that further action in abating these violations devolved upon the board of public works. The proper methods of procedure for the board to take in the matter of abating the violations was clearly pointed out to the commissioner of public works in a letter from this Department dated February 23, 1909, in which a portion of section 71 of the Public Health Law was quoted stating also that the board of water commissioners had a right to maintain action against all the violations cited in the orders sent to the local boards of health, copies of which orders had previously been sent to the commissioner of public works.

The inspection made on October 7 and 8, 1910, showed that out of the 81 cases verified by the Department in January, 1909, and the 6 additional cases of violations reported by the commissioner of public works, 52 violations remained the same as on the previous inspection, 29 have been either partially abated or become more serious, 6 cases have been entirely abated, and 10 new cases of violations were found, making a total of 91 violations existing upon the Nepperhan watershed at present.*

* Space not taken here for the enumeration of these violations.

In connection with the inspection of the violations cited above, an inspection was also made of the sewage disposal plants for the Westchester county almshouse at East View and the Children's Aid Society at Chappaqua.

Plans for the disposal plant for the almshouse at East View were approved by the Department on June 20, 1906, and a permit issued to the board of supervisors of Westchester county on June 27, 1906. Amended plans were approved on February 28, 1907.

The plans approved provided for a settling tank, pump well, four coarse-grain filter beds and subsurface irrigation. It appears that the sewage disposal plant has been constructed in general accordance with the plans, except that the filter beds are somewhat smaller than those provided for by the plans and a cesspool has been substituted for the subsurface irrigation system to receive the effluent from the filters.

The sanitary sewage of the institution flows by gravity to a settling tank and thence to a pump well, both of which are located near the main buildings. From the pump well the settled sewage is pumped about once a day through a 6" force main to the filter beds located about one-quarter of a mile from the settling tank.

The filter beds are between four and five feet deep and are filled with coarse gravel and a mixture of fine gravel and sand, the coarser material being at the bottom. It appears that the top layer consists of the "run" of the gravel pit except that the largest material have been removed.

Two of the four filters are used alternately, while the other two beds are resting empty. The valves of the underdrains which lead to a central manhole are kept partially closed so as to control the flow of the effluent and to keep a portion of the sewage in contact with the lower layer of filtering material for some time. It appears, therefore, that the filter beds under the present method of operation act as intermittent filters and contact beds.

The effluent from the filters is discharged into a large, shallow cesspool, located near the highwater mark of the Nepperhan river and from which it finds its way into the stream in a partially purified state, as the turbid gray color and disagreeable odors of the effluent would indicate.

It appears that, while the plant as constructed is being carefully operated, it is not adequate to properly care for the sewage contributed by the present population of some 380 persons, and does not produce a satisfactory effluent to be discharged into so small a stream as the Nepperhan river, from which a portion of the water supply for the city of Yonkers is taken. The settling tank has sufficient capacity to give the proper time of detention of sewage on the usual assumption as to water consumption. The supplementary treatment works, however, do not produce a satisfactory effluent and have not been constructed in complete conformity with the plans as approved.

The filter beds as pointed out above are smaller than those shown by the plans and the subsurface irrigation system if constructed has been superseded by a cesspool. It was also learned from the man temporarily in charge of the institution that the filter beds, which were not operating properly when he came to take up his duties at the almshouse, were reconstructed at the time of the construction of the cesspool and new filtering material added. The sewage disposal plant as designed did not provide for a direct discharge of sewage into the stream, as the nearest point of the subsurface irrigation system was about twenty-five feet from the edge of river, and it was the purpose of the design that the effluent should reach the stream only after having filtered through a considerable area of the subsoil.

The sewage from the disposal plant as constructed and operated at present leaches through the cesspool near the edge of the river or overflows into the stream in a partially purified condition. That the degree of purification effected is low is shown by the discoloration of the stream near the cesspool and by the disagreeable odors of the effluent.

Although this plant is situated a considerable distance, some ten miles above the Yonkers water supply intake, it appears that, owing to the small volume of this stream and the consequent low dilution of any pollution entering it, the efficiency of purification of this plant is insufficient and should be increased. At the time of the inspection the plant was neither constructed nor operated in accordance with the approved plans as noted above and it

was further the duty, first of the water bureau in accordance with the rules and regulations, to ascertain and remove this violation of direct discharge from the plant, and secondly, the duty of the local board of health under section 84 of the Public Health Law to ascertain the violations of section 76 of the Public Health Law.

In connection with the inspection of the watersheds of the Yonkers public water supply the sewage disposal plant of the Children's Aid Society of New York was also inspected on October 8, 1910. Plans for this sewage disposal plant were approved by this Department on April 20, 1910.

This plant consists of a settling tank, sludge bed, contact beds, sand filters and final absorption trenches in which a portion of the purified effluent is absorbed before reaching a small stream which is one of the tributaries of the Nepperhan river near its source.

It appeared from the inspection that the plant has been constructed in complete conformity with the plans and that it was receiving proper attention. Although no chemical or biological analyses were made of the effluent it was both colorless and odorless at the time of the inspection, which would indicate that the plant was producing a satisfactory effluent for a disposal plant of this type.

The plant will not be taxed to its full capacity until next year, when the new main building now under construction will be completed and occupied. With proper attention and operation, however, the plant should continue to give a satisfactory effluent for a considerable period in the future, providing that the plant be not overtaxed or required to operate at a rate higher than that for which it was designed.

The labor camp of Rheinhardt & Company, maintained in connection with the Catskill aqueduct construction, and located on the west side of the Saw Mill river, about one mile north of Pleasantville, was not inspected by me during my inspection of the Saw Mill river watershed, but was subsequently covered by Mr. F. M. Arnolt, inspecting engineer of this Department, on October 15, 1910.

This camp consists of twelve buildings, which are used for dormitories, kitchens, bath-houses, stable, etc. The average population of the camp is seventy-five persons.

It appears that no sewage, wastes or other refuse matter reaches the stream from this camp, since the solids consisting of fecal matter, garbage and refuse is burned in a small incinerating plant, which is operated continually, and since the liquid wastes from the baths, washtubs and kitchen sinks are discharged into a tight concrete settling tank provided with an overflow pipe which leads to a large open-jointed cesspool constructed in sandy soil and located about 150 feet from the river.

Respectfully submitted,

C. A. HOLMQUIST,

Assistant Engineer

ALBANY, N. Y., *October* 22, 1910.

Board of Water Commissioners, Yonkers, N. Y.:

DEAR SIR: — I am transmitting herewith copies of reports of our engineering division in a matter which should be not only of interest, but of vital importance to the residents of your city, and especially to your board which is the body having official charge and management of the water supply system of your city.

These reports point out a series of conditons existing in connection with the water supply of your city which, in my opinion, are of a serious nature, and call for prompt and effective action by your board. These conditions, with reference to the watershed of the Saw Mill river, as you will remember, were brought to your attention two years ago in connection with an order issued by this Department, calling for an inspection by your officials of the sanitary conditions upon this watershed. At this time you were ad-

vised as to the procedure that should be taken by your board to remove the violations that were found from this inspection, and it was pointed out to you at the same time the necessity for immediate action in regard to those violations, and of the responsibility of your board in the matter.

In the face of these advices and warnings I regret to find, from investigation, that not only do a large majority of the violations which existed two years ago still remain uncorrected, but that others have been found, with a net result that at the present time there are more violations upon the watershed than existed some two years ago. With equal regret I find, as pointed out in the accompanying reports, that the municipal filters are not being operated or managed properly, which results in a low efficiency and delivery to the citizens of Yonkers of a water which can not be considered other than unsafe.

The combination of these two unsatisfactory conditions, in connection with your supply, is a matter which, in my opinion, can not be overlooked by your board, and in transmitting the accompanying reports to you I beg to ask that your board give the recommendations and conclusions prompt consideration, and that you take the necessary action to remove without delay all violations of the water rules now in force for the protection of your supply, and to cause such changes in operation and management of your filter plant as will result in such increased efficiency as to produce a safe and satisfactory effluent, and one which will protect the citizens of Yonkers against the dangers which now exist.

Owing to the importance of this matter I beg to ask that you advise me as to the action taken by your board in this matter.

Very respectfully,

EUGENE H. PORTER,

Commissioner

INVESTIGATION OF COMPLAINTS RELATING TO STREAM POLLUTION

INVESTIGATION OF COMPLAINTS RELATING TO STREAM POLLUTION

If there is any one subject or topic, excepting perhaps that of tuberculosis, over which the people of this State have become thoroughly aroused during the past few years, it is the pollution and defilement of our streams. It is a subject which cannot be discussed too frequently, nor can its importance be too often impressed. Much has been done within recent years, it is true, not only in curtailing but actually eliminating some of the wanton defilement which has up to this time been permitted with many of the streams of our State. A vast amount of work still remains to be done, however, before these streams have been reclaimed to a degree of cleanliness which public decency demands.

It is indeed fortunate that the people of this State have through the educational campaign which has been waged during the past five years, been awakened to a sense of appreciation on the one hand of the healthfulness and comforts derived from preserving our streams in a state of natural purity, and on the other hand of the dangers and annoyance in allowing them to become defiled with sewage pollution.

Difficult as a crusade must be against these practices of sewage pollution, and made more difficult by the lack of adequate laws to enforce its removal, it must be continued energetically until these streams, once pure, have been reclaimed to a reasonable degree of purity. The work of the Department in this field devolves necessarily upon this Division, which is called upon almost daily to investigate and report upon complaints of nuisances arising from stream pollution in different sections of the State.

These nuisances are usually of a public nature, frequently far-reaching in their effect and not infrequently require considerable time to thoroughly investigate and report.

The municipalities where the more important of these nuisances have arisen and received the attention of the Department are the following:

ALLEGHENY RIVER

ALBANY, N. Y., *June* 21, 1910.

Memorandum Re Inspection of Wood Alcohol Plant, at Red House, Cattaraugus County, with Reference to Pollution of Allegheny River

At a conference held on January 17, 1910, at the residence of Commissioner Porter in New York city, between Commissioner Porter and Chief Engineer Horton of the New York State Department of Health, and Chief Engineer Snow of the Pennsylvania State Department of Health, it was agreed that a representative from the New York State Department would be detailed to visit Red House, Cattaraugus county, and take up with the proprietors of the wood alcohol plant at that point the question of eliminating the discharge of acid wastes into the Allegheny, as affecting the water supply of Warren, Pa., since it had been found that creosote and acid tastes and odors in the Allegheny river were not eliminated by the water filtration plant recently constructed at Warren.

On May 17, 1910, Mr. Cleveland visited Red House and obtained the following data, with reference to the plant:

Location.— Town of Red House, Cattaraugus county, ½ mile south of Pennsylvania railroad on northeast bank of Red House creek, 100 rods from creek and 1 mile above Allegheny river.

Name of firm.— A. B. Smith Chemical Company; president, W. W. Smith, 921 White Building, Buffalo, N. Y.; secretary, E. S. Newhall, 921 White Building, Buffalo, N. Y.; superintendent, W. W. Anderson, Red House.

Plant constructed and put in operation in 1900.

Number of employees.— Twenty-three.

Product manufactured.— Wood alcohol, 400 gallons daily; acetate of lime, 8,000 pounds daily; charcoal, 1,800 bushels daily.

Character and amount of wastes.— Drainage refuse from lime tanks, containing, as estimated by superintendent, from 2 per cent. to 2½ per cent. of acetate of lime, together with washings from other tanks, vats and stills cleaned out at irregular intervals. No chemicals, except lime used in process. All work done by baking and distillation. From final process, that of collecting acetate of lime after treatment of "liquid smoke" and distillation of wood alcohol, has been carried on as described later, the residue, consisting of small amounts of insoluble lime, tar and creosote, and about 2 to 2½ per cent. of acetate of lime as noted above, and amounting to 18 or 20 50-gallon barrels, is discharged about once in three weeks onto low ground on the south side of the plant, through which passes a small stream formed by the discharge of condensed water, and this drainage flows 300 feet into Red House creek. There is no domestic sewage discharged with wastes.

Brief description of process.— There are 6 retorts or ovens for baking the wood, 400 tons of soft coal per month being burned under the oven; each oven is 5½ feet wide, 7 feet deep and 32 feet long. Six cords of wood, consisting principally of beech and birch, with about ⅛ maple, are placed in each oven and baked for 24 hours. With 26 working days in a month this amounts to 936 cords of wood consumed per month. Two years ago plant was increased 50 per cent. in capacity. The charge is baked dry, with no steam or chemicals added until charcoal is formed, and the distillation of the wood is complete. Smoke from retorts goes from retort or oven into condensers with water jackets; from condensers resulting liquid is pumped into a series of tanks and some tar settles out and is drawn off; from the tanks the liquid is led into three copper stills and heated by steam coils; from copper stills a portion of the liquid treated is passed into agitator tubs; from the copper stills also tar is drawn off and, with the tar previously collected, is burned under the boiler in power house. The agitator tubs have inside wings or paddles; no heat is applied to them, but common, unslaked lime (45,000 to 48,000 pounds per month) is added until liquid turns from green to cherry red in color; from agitators liquid goes to two stills, heated by steam coils, and alcohol is driven off, acetate of lime being left in the

stills; this is forced out into a settling or lime tank where the insoluble lime settles out and the acetate is drawn off into pans and boiled down to 82° B. It is from this lime or settling tank that the final wastes are discharged as described above.

Means for properly disposing of wastes.— The matter of improvements in the operating arrangements at the plant whereby the wastes might properly be disposed of and the pollution of Red House creek and the Allegheny river, by wastes from the plant thereby prevented, was taken up with the superintendent of the plant, and later with the secretary of the company, at Buffalo.

Considering the relatively small volume of the residue or wastes from the lime or settling tanks, and of the occasional washings from other tanks and vats, it appeared that ample opportunity existed for the disposal of these wastes on low sandy ground south of the plant, and well removed from the stream, and that such a method would prove feasible and efficient, provided the wastes from the settling tanks and the washings from tanks and vats were kept separate from the condenser water.

This separation of clear condenser water from the wastes may be accomplished in two ways:

1. By conveying the condenser water in a separate outlet drain to the creek or nearly to the creek.
2. By conveying the wastes and vat washings from the various processes in a separate conduit to sludge beds or cesspools located at points well away from the stream formed by the condenser water, and from Red House creek.

It was thought by Secretary Newhall that the latter method would be the most effective, as well as the most economical, and he agreed on behalf of the company to proceed at once to effect such disposition of the wastes from the plant.

It was stated that during the spring floods the low areas south of the plant were washed over and the accumulated wastes would thereby be carried into the stream, but at such times the great dilution occurring would minimize the effect of the pollution in the waters of the Allegheny river.

ALBANY, N. Y., *June* 21, 1910.

Memorandum Re Inspection of Wood Alcohol Plant, at Vandalia, Town of Carrollton, Cattaraugus County, with Reference to Pollution of Allegheny River.

At the time of the inspection of the wood alcohol plant, at Red House, by Mr. Cleveland (see separate memorandum) it was learned that a similar plant had recently been constructed at Vandalia, and accordingly this plant was visited for the purpose of determining the extent of pollution of the Allegheny river by wastes from the plant, and of taking up with the proprietors the matter of preventing any pollution of the river that might be found to occur.

The plant is located in the town of Carrollton, one-half mile south of the Allegheny river, and about ten miles above Salamanca.

The plant is operated by the Vandalia Chemical Company, of which Mr. M. F. Quinn, of Olean, is president, and Mr. J. W. Collins is secretary. Mr. Collins is also superintendent. Operations were commenced at this plant in January, 1908.

The number of employees is 22.

The daily output of the plant is 375 to 400 gallons of wood alcohol, 6,000 pounds to 7,000 pounds of acetate of lime, and 1,500 bushels of charcoal.

The processes employed are practically the same throughout as at the Red House plant (see separate memorandum), except that the tar from the settling tanks next in series after the condensers is distilled after being mixed with the lime the same as the smoke liquid, and except that the settlings

in the final settling or lime tank, which received the liquid after the wood alcohol has been driven off and from which tank the acetate of lime is drawn off to be evaporated down to greater strength, are thoroughly drained and the drainings utilized in the process.

This draining is accomplished by discharging onto a slat and burlap strainer the residue in the lime tank. This tank is 4 feet wide, 3 feet deep and 12 feet long and fills up once in two or three weeks so that it must be emptied. The drippings from the burlap strainer fall on an inclined floor and are caught in a trough and returned to the stock vats. After a week or so the trough is removed and the sludge or settlings are drawn into a bin and from the bin are carried to a large cesspool excavated in the sandy soil south of the plant, into which washings from vats and stills are also discharged, and from which it does not appear that any drainage passes into the ditch leading to the river. Some small amount of drainage from the sludge bin, as described above, drains into a stream formed by the condenser water and flows through a ditch to the Allegheny river. This is believed to be the only point in the process from which wastes are discharged that reach the river, and Superintendent Collins assured Mr. Cleveland that he would make arrangements to collect all drainage from this bin and convey it by piping to the cesspool or sludge bed so that pollution of the river would be entirely eliminated.

ALBANY, N. Y., *June* 27, 1910.

SAMUEL G. DICKSON, M.D., *State Commissioner of Health, Harrisburg, Pa.:*

DEAR SIR: — With reference to the pollution of the Allegheny river by the Wood Alcohol Plant, at Red House, in the State of New York, a matter which was taken up by your Chief Engineer, Mr. F. Herbert Snow, with me, and our Chief Engineer, Mr. Horton, in New York, on January 17, 1910, I beg to say that I have had one of our engineers visit this plant, and one not far distant from it on the Allegheny river, at Vandalia, in the town of Carrollton, Cattaraugus county, and I beg to inclose herewith memoranda concerning his investigation of these plants.

These memoranda of our engineers show that a considerable pollution of the river takes place from the discharge of wastes from them into the Allegheny river, and you will note also the matter of removing or correcting this pollution was taken up with the managers of these plants. In both instances the question of possible means of an improvement were discussed, and our engineer has pointed out certain ways whereby the correction or, at least, improvement of the present unsatisfactory method of disposal might be accomplished.

Although I have not the authority to compel the removal of the pollution of these waters by these alcohol plants, you will note from the accompanying memoranda that our engineer urged and recommended that necessary improvements be carried out without delay. In his efforts toward this end he received considerable encouragement from the officials of these two plants, and was practically assured by them that they would proceed at once to effect such disposition of the wastes from their plants as would eliminate or reduce the pollution which has up to this time existed.

Assuring you of my interest in this matter, and trusting that my efforts to induce these companies to bring about an improvement of the present method of disposal of their wastes will be successful, I beg to remain,

Respectfully,

EUGENE H. PORTER,

Commissioner

AUGUR LAKE (Town of Chesterfield)

ALBANY, N. Y., *September* 9, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an inspection of the alleged insanitary conditions of Augur lake, in the town of Chesterfield, Essex county, as affecting the health of the guests of The Interla'ken Hotel.

A complaint of the "bad condition of the water in the lake" was made to Governor Hughes by C. B. White, proprietor of The Interla'ken, on Augur lake, Keeseville, N. Y., on August 10, 1910. This complaint was referred to you for investigation by Col. George Curtis Treadwell, Secretary to the Governor, and at the direction of the Governor.

The inspection of Augur lake was made by Mr. C. A. Holmquist, Assistant Engineer of this Department, accompanied by Mr. C. B. White, his boatman, and one of the guests at the hotel, on August 23, 1910.

This lake is located about 2½ miles southwest of Keeseville, at an elevation of 549 feet above sea level, and has a total drainage area at the outlet of about 13 square miles. The area of the water surface of the lake itself is .56 square miles, and that of Butternut pond, the principal tributary to this lake, and located about 1½ miles to the south, is .22 square miles. Except for Butternut pond the lake seems to be fed largely by small mountain streams, some of which have their source in swampy districts.

The banks of the lake are for the most part steep and rocky, except near the southern and western inlets where there are swampy and marshy areas of considerable extent. It appears also that nearly one-half of the lake has a muddy bottom and is less than five feet deep.

The water in the portions of the lake near the inlets is very shallow, and large areas are covered with water lilies. A number of varieties of other vegetable growths also flourished in the shallow portions of the lake, and in some places were so thickly matted that it was difficult to row through them. On the surface of the water among these growths was a green and gray scum which was said to cover a considerable area at certain periods of the summer.

The water, especially near the vegetable growths, had a slight fishy and vegetable odor. Mr. White stated that these odors became very offensive at times, and that his guests feared an epidemic of some kind. The odors were apparently due to the growing vegetation or decaying vegetable matter and not to sewage pollution, inasmuch as this district is very sparsely populated, and the two houses near the lake, one of which is The Interla'ken, are provided with cesspools.

The water in the lake was of a pea green color which was undoubtedly due to vegetation in the lake. The water, however, is not used for domestic purposes, except for washing, bathing, and laundry purposes. The water used for drinking and cooking is derived from a well located near the hotel.

The proprietor of the hotel stated that the green color of the lake and the peculiar odors of the water prevails for about two months during the summer and was more intense during summers of low rainfalls. Mr. White was of the opinion that inasmuch as the lake is the property of the State steps should be taken by the State to remedy the conditions by dredging the lake, constructing a dam so as to raise the water level some five or six feet, by applying proper amounts of copperas, or by a combination of these methods.

The proprietor of the hotel has constructed a crude dam and flume to furnish power for a water wheel which operates two pumps for the purpose of forcing water from the lake to the storage tank in the attic of the hotel. This dam raises the water level of the lake from one to two and one-half feet, depending upon the season of the year and the amount of precipitation on the watershed. It was impossible to determine what effect this dam has on the condition of the water in the lake, inasmuch as none of the persons in-

terviewed seemed to have noticed any difference between the color and odor of the water before and after the construction of the dam at the outlet.

According to Mr. White, however, it appears that there was, a number of years ago, a mill and dam on the outlet some distance below the present dam which raised the water several feet higher than the present level of the lake, and that before this dam was removed the water was perfectly clear and odorless at all times during the year.

It would appear, therefore, that the condition of the water in the lake would be improved by constructing a dam so as to raise the level of the water in the lake a few feet, but this would involve numerous other complications, among the more important of which are the damage to riparian owners caused by flooding comparatively large areas of pasture or farm lands on the lake, the deleterious effect and possible pollution that would probably result from flooding additional areas that are now thickly covered with vegetation, and the possible damage to owners below the lake by restraining the natural flow of water, to say nothing of the expense of constructing an adequate dam.

The construction of a dam would also involve an extensive study and require a survey which this Department has neither the facilities nor the funds to undertake.

Dredging the lake, and thus excavating the mud and destroying the vegetation, is impracticable and prohibitive on account of the enormous cost of such an undertaking.

The third possible alternative suggested for improving the esthetic conditions of Augur lake, by applying copperas in proper proportions, is the most practicable as well as the least costly of the methods suggested, and has been used with success in connection with impounding and distributing reservoirs for public water supplies in different sections of the country where vegetable growths in shallow portions of reservoirs have created discoloration or disagreeable taste or odors of the water. The problem, however, would require some study and possibly some experimental work, in order to determine the proper amounts of chemicals to use so as to effectually destroy the vegetable growths in the water, and at the same time not injure the fish in the lake. In connection with a scientific application of chemicals in the spring and early summer large quantities of these vegetable growths which tend to discolor the water and produce disagreeable odors could be destroyed mechanically by dragging the shallow portions of the lake near the inlets.

In conclusion, I would say that although the water had a decided green color and a fishy or vegetable odor at the time of the inspection, the conditions were not such as to constitute a nuisance, and inasmuch as the water in the lake is not used for drinking or cooking, but simply for washing, bathing and laundry purposes, and is not polluted by sewage, the condition of the lake, while not pleasant to the sight and smell, can not be said to be detrimental to health.

The question, therefore, does not properly come under the jurisdiction of this Department. It may, however, be possible for Mr. White to solicit the interests of riparian owners and to co-operate with them or to apply to some other Department for assistance in improving the conditions of Augur lake.

I would, therefore, recommend that a copy of this report be sent to Mr. C. B. White, proprietor of The Interla'ken, Keeseville, N. Y., and that he be advised to act in accordance with the suggestions embodied in this report.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

On September 24, 1910, a letter, inclosing a copy of this report, was addressed to Mr. C. B. White, informing him that, owing to the nature of the problem, it is impossible for this Department to offer him any further assistance beyond the suggestions embodied in this report.

BRANT LAKE (Town of Horicon)

ALBANY, N. Y., *September* 15, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on the inspection of the sanitary conditions surrounding Brant lake, in Warren county, made by this Department on August 24, 1910.

A complaint of the insanitary conditions caused by the overflow and the discharge of cesspools in connection with residences into Brant lake was made to this Department by the Brant Lake Association on July 26, 1910. The complaint further stated that "During the past year there has been at least one death caused by typhoid fever at the lake and there have been similar occurrences in previous years, and while we (Brant Lake Association) may not be able to trace it directly to improper drainage, we wish to avoid everything that may tend to a repetition of such occurrences."

The inspection of Brant lake with reference to the discharge of sewage and sewage effluent into the lake was made by Mr. C. A. Holmquist, assistant engineer of this Department, accompanied by Mr. Abel Crook and Daniel B. Freedman, president and vice-president, respectively, of the Brant Lake Association.

Brant lake is located in the town of Horicon, in the Adirondacks, at an elevation of 801 feet above sea level and has a total drainage area at the outlet of about forty square miles. The area covered by the lake itself is 2.2 square miles. The lake is fed by numerous mountain ponds and streams, most of which have their source in swampy districts.

The banks of the lake are for the most part fairly steep, except near the outlet and principal inlets, where there are large, swampy and marshy areas. The soil is composed almost entirely of sand and gravel, affording exceptional facilities for disposing of sewage by means of cesspools or subsurface irrigation.

The Brant lake watershed is very sparsely populated. Along the shore of the lake are some twenty-five houses, mostly occupied by summer visitors. There are also three summer hotels on the lake, one on the eastern shore and the other two on the western shore.

All of the houses, including the hotels, except one cottage, are provided with outside privies or cesspools. This cottage is the property of G. W. Van Slyke of Albany, and is located on a small island about three-quarters of a mile from the dam at the outlet. The complainants stated that Van Slyke's cottage discharged sewage directly into the lake.

All of the cesspools except those connected with the hotels seemed to be adequate to properly care for the sewage discharged into them.

The cesspool in connection with Armagh Lodge, owned by E. H. McAuliffe and run by E. O. Kelso, is located about fifty feet from the lake, and was overflowing into the lake at the time of the inspection. The odors near the cesspool were disagreeable and the conditions insanitary and would tend to create a nuisance under certain atmospheric conditions. This hotel can accommodate about thirty-five guests.

The Pebloe hotel which has been open to the public for five years is provided with two cesspools. One of these cesspools is used for laundry wastes and is located back of the hotel and some 150 feet from the lake. While it showed evidence of having overflowed, the wastes would probably not reach the lake under ordinary conditions.

The other cesspool is located in the road in front of hotel property and about twenty-five feet from the lake. This cesspool is provided with a 2-inch overflow pipe which extends some thirty feet into the lake. It was learned from the proprietor of the hotel that during one of the heavy rains this summer the cesspool broke through the ground and its contents flowed into the lake. This hotel has a maximum capacity sufficient to accommodate

eighty guests, and is owned by P. Smith of Horicon and operated by H. W. Stewart of New York city.

The Palisades hotel is located about midway up the lake on the western shore. The present building has been located on the present site for about three years and is owned and run by Margaret and William Owen. This hotel has a maximum capacity for accommodating ninety-two guests and has an average of seventy-five guests during the summer.

There are three large cesspools in connection with the Palisades. These cesspools are all connected but are not provided with overflow pipes.

The first cesspool is located about 50 feet from the lake and is 14′ x 13′ x 7′ deep. The second is about 25 feet from the lake and is 7′ deep and has an area of 282 square feet. The third cesspool is located about 15 feet from the lake, is 5′ deep and is 25 feet long by 8 feet wide.

These cesspools are inadequate as to capacity to care for the sewage as shown by the fact that the last cesspool had overflown into the lake a short time before the time of the inspection and several loads of sand and gravel had been deposited near the break in order to cover up the filth caused by the discharge.

While all the hotels and cottages cut their ice supply from the lake the water of the lake is not used for domestic purposes as far as could be ascertained, except for washing, bathing and laundry purposes. The water used for drinking and cooking is supplied from individual springs and wells.

In conclusion, I would say that while the amount of sewage that reaches the lake from cesspools along its shores is comparatively small and would probably not endanger the health of the people living along the lake, at all times, contamination and pollution of the lake nevertheless exists inasmuch as sewage or cesspool effluent reaches the lake at least occasionally from one hotel and one summer house and continually from two of the hotels during the greater part of the summer.

It appears, therefore, that danger of contamination is always present and inasmuch as no permits have been issued by this Department to the owners of these places allowing the discharge of sewage or sewage effluent into this lake, any such discharge into the lake is in direct violation of section 76 of the Public Health Law.

I, therefore, recommend that letters be addressed to the proprietors of the hotels and to G. W. Van Slyke informing them of their violation of the Public Health Law insofar as they are discharging or allowing the discharge of sewage or sewage effluent into Brant lake without permits from this Department and advising them to either enlarge their present means of sewage disposal or if conditions permit to provide for supplementary treatment of sewage, such as subsurface irrigation or sand filtration, and further that if the conditions complained of are not remedied the complainants be advised to bring the matter to the attention of the local board of health, which has full power and authority under the Public Health Law to compel an abatement of the insanitary conditions now existing.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

On September 30, 1910, letters, inclosing copies of this report, were addressed to Mr. G. W. Van Slyke and to the hotel proprietors, calling their attention to their violation of the Public Health Law by the discharge of sewage from their premises into Brant lake and urging them to provide for adequate means for sewage disposal so as to improve the sanitary conditions by preventing the discharge of sewage into the lake. The proper method of caring for the sewage from their properties was outlined in a general way and they were advised to secure the services of a competent engineer to work out the details of the design of any system adopted.

BRONX RIVER

ALBANY, N. Y., *December* 8, 1910.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report on an inspection of the pollution of the Bronx river, made at your direction on November 30, 1910. This inspection was made in response to a request contained in a resolution passed by a joint meeting of the town boards of health of the towns of Scarsdale and Greenburgh, Westchester county, on November 22, 1910.

The communication from the secretary of the board of health of the town of Greenburgh in which the request for the inspection was made, also stated that it was the desire of the boards of health of the towns of Scarsdale and Greenburgh that following the inspection of the pollution of the Bronx river from White Plains to the Yonkers city line, a joint meeting be called by the State Commissioner of Health of the boards of health of the towns of Scarsdale and Greenburgh and of the village of White Plains for the purpose of taking up the question of the abatement of the nuisance caused by the pollution of the Bronx river.

In connection with the investigation, a visit was made to the White Plains sewage disposal plant, the operation and the inadequacy of which have been previously described in your reports of inspection of the pollution of the Bronx river dated October 24, 1906, and October 28, 1907, in a similar report by the writer dated October 7, 1907, and in a report by Mr. E. T. King, formerly inspecting engineer with this Department, dated March 12, 1906.

In all the above reports, which are reproduced in the 28th annual report of this Department, the grossly polluted condition of the Bronx river due to the discharge of insufficiently treated sewage from the White Plains sewage disposal plant is described.

In reference to the present operation of this sewage disposal plant it may be said, from an inspection of the stream at the point of discharge of effluent from the plant and from data obtained and observations made at the plant, that although a decided improvement in the operation of the plant has been made within the past two years, following, as far as such improvements have been made, the suggestions contained in your report dated October 24, 1906, the effect of the discharge of effluent from the plant in polluting the Bronx river is as great or greater than at the time of the former inspections. Since the plant was inspected by this division in 1906 the population of White Plains has increased from 12,000 or 13,000 to 17,500, resulting in an increase in the overtaxing of the plant which was occurring even at that time, and which was then estimated to amount to at least a doubling of the permissible rate of operation of a sewage treatment plant of this type.

Respecting the alternative means for improving conditions in the stream by the adoption of suggested improvements in the operation of the plant contained in your report of October 24, 1906, which were:

1. A changing over from the "fill and draw" method of operating the tank to the "continuous flow" method.
2. An increase in the effective depth of the flow through the tanks.
3. An increase in the capacity of the tanks by means of a rearrangement of the partitions.
4. An increase in the amount of lime used to precipitate the sewage.
5. Better arrangements for proper mixing of the applied solutions and a greater uniformity in applying the milk of lime solution to the sewage at the entrance to the tank; it appears from the recent inspection of the plant that several of these suggested improvements have been brought about, as follows:

1. The siphons which caused the intermittent discharge of the contents of the tanks have been removed and overflow weirs have been placed at the outlet of the tanks, thus changing the manner of operating the tanks to the "continuous flow" method.

2. Whereas the siphons originally in place allowed the tank to fill to a depth of only 3 feet before discharge, the overflow weirs are now placed so as to give a depth of flow in the tanks of 5 feet, thus increasing the capacity of the tanks by nearly 70 per cent.

3. No change has been made in the partitions of the tanks so that the sewage flows through the three channels in the tank, as formerly, before its discharge.

4. Whereas, in 1906 and 1907, the amount of lime used daily was stated to be 6 or 8 barrels, together with one carboy of perchloride, it is evident from the statements made by Superintendent of the plant, Mr. A. O. Comstock, and by Mr. Alonzo Boese, inspector for the board of health for the town of Scarsdale, who visits the plant regularly, that 10 barrels of lime are now used daily, amounting to 14 grains per gallon of sewage, together with 240 pounds of perchloride of iron daily, amounting to 1¾ grains per gallon of sewage. In addition, 45 to 50 pounds of chloride of lime are placed in a manhole outside of the plant over the main sewer.

5. The mixing trough, which was formerly under the floor of the plant, has been raised above the floor; the lime is placed in this mixing trough through the middle of the day at the rate of one and one-half barrels per hour, two troughs being used, so that the lime is slaking in one trough, while the solution is flowing to the sewage from the other.

Notwithstanding the improvements made in the operating arrangements of the plant the increased amount of lime used and the increased care evidenced in the maintenance of the plant, the plant is very badly overtaxed, the lack of increase in efficiency being due no doubt to the increased amount of sewage which must be treated. The river is, therefore, still badly polluted by the effluent from the plant and it is evident that a connection from the White Plains sewer system should be made to the Bronx Valley trunk sewer as soon as such sewer is completed and ready for use, in order to remove the present pollution from the stream.

Respecting the Bronx Valley trunk sewer, it was learned from a conference held at White Plains with Mr. George R. Byrne, chief engineer of the Bronx Valley Sewer Commission, that this sewer was about 95 per cent. completed on December 1st, and was progressing at the rate of about 3 per cent. of the total construction per month, the unfinished portions being about 500 feet of the sewer in Tuckahoe, 500 feet in South Bronxville, and sections aggregating about 2,200 feet from South Bronxville to the portal of the tunnel which extends from Wakefield to the Hudson river. It is expected that the work of constructing the trunk sewer which was started in March, 1908, and consists of the construction of 15 miles of trunk sewer, 3 miles of which were in tunnel, will be completed by January 15th, and that the sewer will then be ready for use as an outlet for sewage from the towns and villages through which it passes. The chief engineer stated that there would be no legal difficulties to prevent the use of the sewer on its completion, that no permanent injunctions had been obtained against the work, and that no further action or applications by village authorities were necessary in order that sewage from such villages might be discharged into the completed sewer, such use of the sewer depending simply upon the announcement by the Bronx Valley Sewer Commission, that the sewer was completed and ready for use.

In company with Mr. Alonzo Boese, inspector for the board of health of the town of Scarsdale, an inspection was made of two sewers within the limits of the village of White Plains, one discharging into a cesspool on the east bank of the Bronx river, in the village of White Plains, a short distance above the White Plains sewage disposal plant, the overflow from the cesspool flowing directly into the river at the foot of Colden avenue; the other sewer, which was formerly a blind drain, being laid through Stephens avenue and discharging at the southerly line of White Plains village, at Farley road, into a ditch which discharges into a small stream, this stream discharging into Bronx river about a half mile below the Hartsdale station.

Each of these sewers receives sewage from about thirty houses in the village of White Plains. The first one (the one in Colden avenue) was evi-

dently constructed by the village authorities about five years ago. The second one described has evidently existed as a ground water or storm drain before connections for the discharge of house sewage into this drain were made by private owners.

An incompleted sewer has also been constructed in Farley road by the Scarsdale estates, but no houses have been built as yet in the development of the Scarsdale estates in this section, and the sewer at present has no house connections and no outlet.

The discharge from these two sewers adds to the pollution of the river and steps should be taken by the village authorities to deliver the sewage collected by these sewers to the Bronx Valley trunk sewer on its completion.

An inspection of the Bronx river was made at various points from White Plains to Bronxville, with special reference to the effect on the river of the discharge of effluent from the White Plains sewage disposal plant, from the two sewers described above, from the outlet of the septic tank of the Caroline Rest Maternity Hospital, at Hartsdale, and from the sewage disposal plants at the villages of Tuckahoe and Bronxville.

At the bridge on Railroad avenue, in the village of White Plains, the Bronx river showed no considerable visible evidences of pollution, although garbage and rubbish have been thrown into the stream. The stream was fairly clear and gave off no odors from this point nearly to the White Plains sewage disposal plant.

As stated above, sewage from about thirty houses is discharged into a small cesspool at a point a short distance above the sewage disposal plant, and the overflow from the cesspool discharges into the stream and produces a marked pollution of the stream.

The effluent from the White Plains sewage disposal plant was of a reddish brown color as it left the plant, and when it reached the stream through the outlet sewer at a point about 2,000 feet below the plant, was of a light slate brown color. The stream was badly polluted by the effluent from this plant, as far as the Scarsdale station, a distance of some three miles, and sewage growths covered the bed of the entire stream for the greater portion of this distance.

The effect of the stream of the discharge of effluent from the Tuckahoe and Bronxville sewage disposal plants, as well as from the septic tank at the Caroline Rest Maternity Hospital, at Hartsdale, while adding considerably to the pollution of the stream, in no way compares in intensity to the pollution due to the discharge of effluent from the White Plains sewage disposal plant. The plans for the septic tank to treat sewage from the Caroline Rest Hospital, at Hartsdale, approved by this Department on October 28, 1907, provides for an extension of the outlet sewer so as to discharge the effluent into the Bronx Valley trunk sewer on its completion, and the permit issued for the discharge of effluent from this plant into the Bronx river is revocable on completion of the Bronx Valley trunk sewer.

During the inspection a conversation was had by telephone with Mr. Charles D. Millard, president of the board of health of the town of Greenburgh, and he stated that he was pleased that the matter had been taken up by the Department, and also stated that the board of health of the town of Greenburgh, while realizing that with the early completion of the Bronx Valley trunk sewer and the connecting of the White Plains sewer system with the trunk sewer, the pollution of the river now caused by the discharge of effluent from the White Plains sewage disposal plant would be prevented, it was the desire of the board, also, that pollution now added to the river from other sewers not connected with the White Plains sewage disposal plant be removed from the river.

In conclusion it may be stated:

1. That, notwithstanding the improvements in the operation of the White Plains sewage disposal plant made during the past two or three years, the pollution of the Bronx river by the discharge of effluent from the plant, owing to the increased amount of sewage to be treated, has not been diminished.

2. That considerable sewage pollution is added to the river by the two sewers, in the village of White Plains, described above, one dis-

charging at the foot of Colden avenue, and one into a stream which reaches the river one-half mile below the Hartsdale station.

3. That additional pollution is added to the river by the discharge of partially treated sewage from the sewage disposal plants at the Caroline Rest Maternity Hospital, at Hartsdale, and at the villages of Tuckahoe and Bronxville.

4. That the effect of the discharge of sewage and sewage effluent at these principal points of pollution is to set up a condition in the Bronx river which constitutes a public nuisance along the stream adjoining the towns of Scarsdale and Greenburgh, and along the major portion of its flow adjoining the city of Yonkers and the town of Eastchester.

5. That this condition of nuisance in the stream will be almost wholly, if not entirely, eliminated by the discharge of sewage from the various sewer systems and sewage disposal plants into the Bronx Valley trunk sewer upon its completion, rather than into the Bronx river, as at present.

I would, therefore, recommend that the attention of the various municipal authorities and of the authorities at the Caroline Rest Hospital be called to the necessity and desirability of making early and definite arrangements for the elimination of all sewage discharge into the Bronx river by the conveyance of all sewage to the Bronx Valley trunk sewer upon its completion, if such provision has not already been made.

Respectfully submitted,
H. B. CLEVELAND,
Principal Assistant Engineer

This matter was taken up with the municipalities along the stream to determine what arrangements had been made to connect sewer systems with the Bronx Valley sewer when completed.

CORTLAND

ALBANY, N. Y., *February* 11, 1910.

To the Mayor and Common Council, Cortland, N. Y.:

GENTLEMEN: — I beg to submit for your careful consideration the matter of pollution of Tioughnioga river by the sewage of the city of Cortland, and to urge that some action be taken to relieve the insanitary conditions of the stream resulting from this pollution by the construction of appropriate and adequate means of sewage purification.

This question is one which, as you know, has been under consideration and investigation by this Department for a number of years, especially with respect to the industrial wastes from the Wickwire Brothers' plant, and as a result of these activities and the action of the Wickwire brothers a practical elimination of the pollution of this stream from this source has now been accomplished. The insanitary conditions in and along this stream, resulting from sewage discharged from the city of Cortland, still exist, and it is to the elimination of this sewage that I now have particular reference.

Renewed complaints signed by many residents and property-owners along the Tioughnioga river have only recently been received by me, and a careful inspection of the conditions along the river has again been made by one of the engineers of this Department. From his report of his inspection it appears that the following conditions were found to exist:

The sewage of the city of Cortland is discharged without treatment into the Tioughnioga river, about a mile below the city, and there can be no question but that the effect of this discharge is plainly visible in the waters of the river. The immediate effect of this discharge is a dirty white stratum or current which clings to the west shore for a mile or more, its color distinguishing it from the other parts of the stream. Two miles below the outfall the velocity of the stream is decreased by the dam at Blodgett's Mills, and from there on the water has a reddish brown or rusty color, due to particles of iron oxide, apparently, which in places seem to float in the water.

It was commonly believed that this iron rust came from the wastes of the Wickwire Brothers' Wire Cloth Mills, and chiefly from the vats of dilute acid which are used to clean the wire, and which are said to be emptied into the sewers whenever the acid becomes too dilute to do its work. The Wickwire Brothers' plant was examined with reference to the vats above referred to and to the method of disposal of their contents. It was found that, in deference to the suggestions of the State Department of Health made to the mayor of Cortland, and to Messrs. Wickwire, referred to on page 324, volume II, of the Twenty-eighth Annual Report, plans had been made and a process inaugurated for treating this acid waste, and while it had taken a long while to get the plant working properly, while machinery had been installed only to prove useless and to be thrown away, and while the treatment of these wastes had involved some extensive changes in the arrangement of the vats themselves and in the drainage of the whole plant, success has finally been achieved, so that all the vat liquor is now converted into sulphate of iron or copperas, with no wastes left to discharge into the stream.

Judging from the large quantity of sewage discharged by the city of Cortland and the small flow of the stream, especially during the season of low flow, it is evident that the effect of the city sewage on the river can not but be objectionable in the way of a nuisance. No gaugings of the Tioughnioga river are available by which to determine the minimum flow of the stream. Gaugings of the Chenango river (drainage area of 1,530 square miles) show an ordinary minimum flow of about 0.2 cubic feet per second per square mile. (U. S. G. S. Reports, No. 109, p. 37.) And on account of the large watershed this is undoubtedly higher. In fact, in other streams of this part of the State, the writer has had instances, on small sheds of flows as low as 0.05 cubic feet per second. It is reasonable to assume that in the case of Tioughnioga river above Cortland, the area of which is about 260 square miles, that the minimum flow may, in the summer, be as low as 0.1 cubic feet per second per square mile, or 26 cubic feet per second. If the ratio of flow to persons contributing sewage to the streams be taken at 5 to avoid a nuisance the river will care for the sewage without nuisance of only 5,200 persons. The present population of Cortland is estimated at about 13,000, the 1905 census reporting 11,272. Even if all the city is not entirely sewered it is evident that the amount of domestic sewage discharged into the river at one point is more than the oxygen in the river water can assimilate, and the production of a nuisance is assured. The fact that from the wire mills, the milk station and other factories, organic matter is discharged, tends to decrease the ability of the river to take care of the wastes from residences, and increase the nuisance in the river. It is also worth noting that while the effects of the iron wastes are particularly noticeable two miles or so below the mouth of the sewer the odors have not yet become offensive, and it was not until below Blodgett's Mills that the decomposition of the organic matter had proceeded so far as to be offensive, indicating that the organic matter of the sewage was responsible for a part of the nuisance, and that the iron wastes did not cause all the trouble.

It is clear, therefore, from the recent examination of the condition of this river below Cortland, that this nuisance is due chiefly, if not entirely, to the sewage of the city of Cortland, and that, while in the past, the acid iron wastes from the Wickwire Brothers' Wire Works contributed to the nuisance, since September this has no longer been an important factor. It is further clear that the only effective means by which this nuisance can be remedied or abated is by a proper and adequate treatment of the sewage of the city before its discharge into the Tioughnioga river.

I would, therefore, urge upon you the importance of giving immediate consideration to this important matter, and of taking the necessary action to provide plans and undertake the construction of such sewage treatment works as will eliminate the existing pollution of these waters and remove the nuisance and danger to health of the riparian owners and communities along the river below the city.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

ESPERANCE

ALBANY, N. Y., *October* 21, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation just made, of an alleged nuisance with reference to the closing of a drain and the consequent flooding of cellar and property of Mr. John Wright, located at Esperance, Schoharie county.

Mr. Wright called at this Department recently and complained of the conditions near his home, stating that the board of health of Esperance desired that an investigation be made by this Department and that recommendations be made to the village authorities to improve the conditions. On October 22d, Mr. Fritz M. Arnolt, inspecting engineer with this Department, visited Esperance and investigated the alleged insanitary conditions.

Mr. John Wright's home is situated near a natural watercourse draining a considerable area of land to the south and west of his house. To improve the drainage in the vicinity of his house, Mr. Wright had constructed a ditch years ago just west of his property which led the drainage through a culvert under the Charleston road and then by means of drain, ditch and natural watercourse into the Schoharie creek. The village authorities have constructed a tile drain on Charleston road and have closed up the culvert mentioned, forming, with the road, a dam, holding the surface wash south of Charleston road. A considerable area of land west of Mr. Wright's home becomes flooded in the time of heavy spring rains and the water remains near his house for long periods of time and seeps into his cellar. The village authorities in closing the culvert have interfered with the natural drainage and have made no provisions to prevent the flooding of the property adjacent to Mr. Wright's. This gives rise to a condition which is insanitary and detrimental to the health and welfare of the residents of this section of the village and especially of the occupants of Mr. Wright's house.

I would, therefore, recommend that the board of health of the village of Esperance be advised to take up with the trustees the matter of providing a proper outlet for the natural drainage so as to remedy the insanitary conditions caused by blocking the culvert above mentioned and the flooding of the area near Mr. John Wright's house.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

On November 1, 1910, a letter, inclosing a copy of this report was addressed to the local board of health, requesting that the matter be taken up with the board of trustees and steps be taken to remedy the insanitary conditions complained of to this Department.

HARRIMAN

ALBANY, N. Y., *October* 18, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation recently made of an alleged nuisance at Harriman, N. Y., attributed to the discharge of sewage into the Ramapo river and its supposed retention in a small pond at Harriman.

Complaint has been received by this Department that the odors arising from the pond were very offensive. On September 27th Mr. Fritz M. Arnolt, inspecting engineer with this division, visited Turners (now called Harriman)

and made an investigation with regard to the odors arising from this pond and their cause.

The pond at Harriman is formed by damming the Ramapo river. The Ramapo river rises in Round lake, which is located in the town of Monroe, Orange county, N. Y. It flows northeast for about 1¼ miles to the village of Monroe. Here it flows through a pond which is locally known as Knight's mill pond. This pond receives from the west side the sewage from about nine houses, from the east side the sewage from ten single houses, and also on this side from a private sewer serving nine office buildings in the village of Monroe. This sewer has been constructed and has been in operation for about twenty years. Three creameries, together handling about 100 cans of milk a day, discharge their washwater into the pond. Most of the sewer drains are not led beneath the surface of the water but discharge on the ground some feet back from the shore. This gives rise to local nuisances.

Knight's mill pond is from 200 to 300 feet wide, about 2,200 feet long and does not average more than a couple of feet in depth. The water is clear and except in the immediate vicinity of the sewer outlets, shows no discoloration from the sewage. In the dry season, only a small amount of water flows over the dam. After leaving this pond the Ramapo flows southeast for about 2¼ miles, through Turners, now called Harriman, continuing in this direction about a mile beyond Harriman, and then flowing southward and emptying into the Pompton river in New Jersey.

About a quarter of a mile below Knight's mill pond the Ramapo river receives a small tributary from the north. This tributary receives the sewage of about eight houses in Monroe. A mile below Monroe is a small mill pond about 300 feet by 500 feet. This water is clear and shows no evidences of sewage pollution. A considerable growth of duck-weed or Lemna, however, covered the surface of the upper half of the pond. About a mile and a half further down is the storage pond at Harriman. Between Monroe and Harriman the Ramapo flows through uninhabited meadow land and receives practically no pollution.

The pond at Harriman is about 300 feet long and about 150 feet wide. The area west of the Erie railroad track which is the upper end of the pond is comparatively shallow. At the time of the inspection the pond was almost empty and the larger portion of the bed was exposed. The bed was covered with a thick mat of algae growths. This was decaying in the sun and gave off an offensive odor. The exposed mud flats at the upper end of the pond also gave off an offensive odor. Garbage is thrown on the west bank of the pond on the Harriman-Monroe highway.

The dam at this pond, which is now owned by Mrs. E. H. Harriman, has been poorly constructed and leaks considerably. Due to the extreme drought of the past weeks there was very little flow in the Ramapo river. The Erie Railroad Company also pumps considerable water from this pond to supply its engines. These three factors, leakage, drought and draft by the Erie, have kept the water level in the pond very low and a large area of pond bottom with its mud flats and algae growths have been exposed, giving rise to offensive odors due principally to decaying microscopic life.

The quantity of sewage discharged into the Ramapo above Harriman is not large and the dilution even in periods of low water is amply sufficient to render the sewage non-putrescible before it reaches Harriman. It receives considerable storage in the two mill ponds and is probably thoroughly oxidized and purified by the time any of it reaches Harriman. No nuisance at Harriman can, therefore, be attributed to the discharge of sewage into the Ramapo at Monroe.

The principal nuisance at Harriman is due to the odors from the decaying microscopic life lying exposed on the bed of the pond and also to the odors from the mud flats themselves. The throwing of garbage on the bank of the pond is also an insanitary feature.

I should recommend that the board of health of the town of Monroe be advised to take such steps as may be necessary to keep the bed of the lake covered. Seeing that the leaks in the dam are repaired would be a step

toward this end. Also that they prohibit the dumping of garbage on the shores of this pond.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

On November 2, 1910, a letter enclosing a copy of this report was addressed to the board of health of the town of Monroe, urging them to take suitable action to remedy the insanitary conditions existing at Harriman and calling their attention to the provisions of section 76 of the Public Health Law, which prohibits the discharge of sewage created since 1903 except under express permission from this Department and to the duty of the local boards of health to enforce this and subsequent sections of the Public Health Law.

ONEONTA

ALBANY, N. Y., *August* 17, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation made at your direction and in compliance with the request of the common council of the city of Oneonta, Otsego county, of an alleged nuisance caused by the discharge of waste from the gas plant of the Oneonta Light and Power Company into the Susquehanna river.

On August 6th Mr. Fritz M. Arnolt, inspecting engineer of this Department, visited Oneonta and made an investigation of the conditions there. He was accompanied on his first inspection of the river and the gas plant by Dr. George W. Augustin, health officer of Oneonta.

The gas plant of the Oneonta Light and Power company is located on the south bank of the Oneonta Milling Company's power canal, about a hundred yards southeast of the Delaware and Hudson railroad station. Mr. Edward B. Arnold is president and Mr. John R. Glading is secretary and treasurer of the company, having an office at 55 Canal street, Providence, R. I. Mr. C. A. Lane is superintendent at Oneonta. The plant consists of two sets of gas making apparatus, to be used alternately with one set of scrubbers and condensing apparatus. The capacity of the plant is about 60,000 cubic feet of gas per day of twenty-four hours. At present the plant is in operation only ten hours a day, manufacturing from 35,000 to 36,000 cubic feet of gas.

A set of gas making apparatus consists of a generator, a carburetter and a superheater. The carburetter in this system is placed on top of the generator and both inclosed in one steel cylinder. The superheater, scrubber and condenser are all inclosed in steel cylinders. These cylinders are about 4½ feet in diameter and twelve feet high. Anthracite coal is placed in the generator and live steam is passed through the heated coal, the run of steam lasting seven minutes and the blast five minutes. The gas formed during the run, consisting of a mixture of HCO, CO_2 and N, is passed upward at a high temperature through the carburetter. During its passage through the carburetter, it is sprayed with gas oil to give it illuminating properties. The use of crude oil in small plants has not proved sufficient. From the carburetter the gas passes downwards into the superheater, which is a steel cylinder of the same size as the generator lined with fire brick with about 50% voids. Here a temperature of about 1,600 degrees Fahrenheit is reached and the gas is made stable.

From the superheater the gas passes through a water valve to a scrubber. The water valve has a steel shell two feet in diameter and two feet deep. From the water valve the gas rises upwards through a scrubber, which consists of a steel cylindrical shell four feet in diameter and twelve feet high, containing perforated wooden trays through which water trickles downward. The cooling in this wet scrubber produces condensation and considerable

precipitation of tar and lighter hydrocarbons. These pass off with the waste water into a settling basin which will be described later. From the scrubber the gas passes downward through a tubular condenser which is inclosed in a steel cylinder. The gas passes through the tubes and water is caused to circulate on the outside of the tubes. From the condenser the gas is passed through the purifiers which consist of two castiron boxes 8'x10'x5'. A sheet of burlap is placed in the bottom of the boxes. On top of this is spread a layer of sawdust or planing shavings about six inches thick to absorb tar and other hydrocarbons. The rest of the box is filled with Conley iron sponge. From the purifiers the gas is passed into two storage tanks, one having a capacity of 15,000 cubic feet and the other 10,000 cubic feet. A new storage tank having a capacity of 100,000 cubic feet is being constructed.

The waste water from the water valve and from the scrubber flows into a settling tank devised by the United Gas Improvement Company of Philadelphia and known as a separator. This consists of a tank 4' x 5' x 9' with four baffle walls. The waste water enters from a small box having a perforated end and located at one end at the upper part of the tank. The effluent leaves by means of a 3" pipe located at the top of the other end. Here it passes into a city sewer and is eventually discharged into the Susquehanna river.

About 3,550 cubic feet of water were used per day in the operation of the plant. When this reaches the settling tank it is very rich in tar and lighter hydro carbons. As the tank has a capacity of 1,350 gallons, a detention period of about nine hours could be obtained. But this is considerably lessened by the fact that a comparatively large amount of water leaks through the bank of the power canal and flows into the separator. The surface of the water in the canal at the time of the inspection was 2½ feet above the outlet of the separator. The water has either found its way through the bank alongside of some root or through a boring made by water rats. The amount of water was measured by means of a small triangular weir and was found to be about 4,800 gallons per day, reducing the detention period in the separator from nine hours to about four hours. At the time of the inspection the effluent from this tank contained very little oil and tarry matter. Two compartments, formed by the baffles at the lower end of the tank, were, however, completely filled with a thick unctuous tarry mass. A pipe extending to the bottom of the tank is located at the lower end by means of which the tarry deposit could be drawn off with a pump. No pump, however, was connected with this pipe, the tank being cleaned monthly by means of buckets. The material removed was buried; no attempt being made to burn it in the plant, due to great amount of smoke it would cause.

The effluent from the tank is discharged into the city sewer, flowing about 3,000 feet before being discharged into the Susquehanna river, just above the mouth of the Milling Company's canal. An inspection of the river at this point was made on three successive days, August sixth, seventh and eighth and a walk along the bank four miles down the river on one side and then back on the other, showed no evidence of any serious pollution due to gas wastes. A few patches of oil were discovered but these could be traced as coming from the sewer outlet furthest down the river serving the shop section of Oneonta. In small sheltered coves just below the sewer from which the gas wastes were discharged small patches of oil were visible. At no time, however, was oil visible on the river at any extent that would cause a nuisance.

During the three days on the river no odor due to wastes from the gas plant could be detected. Interviews were held with a number of citizens living or working in the vicinity of the sewer outlet through which the gas wastes were discharged. Their opinions in regard to odors were very diversified. Mr. W. H. Johnson, who owns the house and property at 15 Main street, about 600 feet from the outlet in question, and resides there during the summer months, stated that he first noticed the odor in May and had since noticed it two or three times at intervals of about a month. He stated that it smelled exactly like illuminating gas and that the odor was so intense and disagreeable that he was forced to close his windows. The odors he stated always appeared between four and nine P. M. and at times when the atmosphere was very close and muggy. Mr. A. A. Frasier, living at 34 Main street,

about 1,000 feet from the outlet in question, stated that he had noticed a very strong disagreeable odor every three or four days. It was very apparent on close and muggy nights and he stated that the direction of the wind did not seem to have any influence. He was positive that the odor resembled that of illuminating gas. Dr. George V. Augustin, health officer, stated that he was continually receiving complaints from people living near the river and that most of these stated that the odor did not exactly resemble that obtained when one opened the gas cock in a house but had a tarry odor. Mr. H. M. Goldsmith, superintendent of the Oneonta Milling Company's plant, situated about 600 feet from the outlet in question, stated that he never had detected any odor from the sewer outlet that was so disagreeable as to constitute a nuisance, nor had any of his men ever complained of any disagreeable odors or mentioned it to him. They would naturally mention it he said, if such odors occur, as he was with his men a good part of the time. Other citizens, with whom interviews were held, either did not smell anything or stated that they had occasionally noticed disagreeable odors but had attributed them to smoke and gases from the railroad engines.

Several visits to the outlet in question failed to reveal any evidence of gas wastes in the sewage emerging from the sewer, either by the appearance of oils or by any odor suggestive of gas wastes. There must, however, have been some cause for complaint and an effort was made to determine the origin of any disagreeable odors. Although discounting largely for the fact that it takes a trained observer to clearly differentiate odors, it seems probable that occasionally an odor due to gas waste could be noticed. This could be brought about when for some reason or other a large amount of tar and other hydro-carbons were flushed out of the separator. The condition of the separator showed this to be possible. It is very probable that the gas from the engines on the Delaware and Hudson Railroad would at times constitute a nuisance. This was noticed by the inspecting engineer while walking on Main street near Mr. Johnson's home. Several of the citizens interviewed stated that they had noticed a disagreeable odor occasionally and believed it to be caused by the engines on the Delaware and Hudson Railroad.

No one seemed willing to attribute the odors to the discharge of sewage into the Susquehanna river. At present, however, this constitutes a real nuisance. The city of Oneonta is almost completely sewered. It has four sewer outlets discharging into the Susquehanna river. The upper outlet, located about half a mile above Main street, discharges approximately 100,000 gallons of sewage per day based on the tributary population. The outlet does not run directly into the river but flows about 150 feet through an open ditch and discharges into an open natural basin, formed on the shore of the river by sand bars. This basin is about 100 yards long and from 20 to 40 feet wide. It is filled with sewage which is retained here for days and allowed to undergo putrefaction, giving rise to intensely disagreeable odors. The second and largest outlet is just above the mouth of the Oneonta Milling Company's canal. It is this sewer which receives the wastes from the Oneonta Light and Power Company's gas plant. This discharges about 400,000 gallons of sewage per day. The outlet at the present low condition of the river was above water. The river at this point was highly discolored with sewage. Fish stirred up bottom deposits and large masses were frequently seen arising to the surface accompanied by enormous bubbles of gas. This pool was constantly giving off bubbles, showing a septic condition, and the odor could without doubt be characterized as a serious nuisance.

Just below this under the Main street bridge over the Susquehanna is a third outlet. The sewage bubbles through a pile of rocks above water and flows into the stream. About 100,000 gallons of sewage per day comes from this outlet, forming just below it another pool of sewage about 20 feet wide and 150 to 200 feet long, which is also in a septic condition and gives off a disagreeable odor. The fourth outlet is about a mile below this and discharges about 100,000 gallons per day. This sewage does not appear as strong as that coming from the other outlets. It is discharged into rapidly flowing water and is quickly taken away. The outlet is far below the village and no serious nuisance due to odors can at present come from this outlet. The other

three outlets, however, give rise to a very disagreeable odor and it is very probable that the nuisance referred to in the complaints is in a large measure due to the discharge of sewage into the river, particularly at the periods when the river is at its low stage. In this connection it should be stated that in the permit issued by this Department on September 22, 1909, allowing the discharge of sewage into the Susquehanna river from the sewer extensions in Fonda avenue, Chestnut street and Gilbert street in the city of Oneonta, the condition was imposed that plans for sewage disposal must be submitted on or before April 1, 1911.

In conclusion, I beg to point out the following conclusions resulting from the investigation, that:

1. No evidence that the effluent from the separator at the gas plant created a nuisance could be obtained at the time of the inspection.
2. However the efficiency of the separator was very low and it is very probable that occasionally this effluent would create a nuisance.

I would recommend that the city authorities be advised to require the Oneonta Light and Power Company to close the leak in the bank of the canal and prevent any water from the canal entering the separator.

Also that they require the Oneonta Light and Power Company to provide some satisfactory means of cleaning the separator efficiently and frequently so as to prevent the possible occasional flushing out of the tar deposits. A suitable pump with flexible suction arms would give the desired result.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

On August 18, 1910, letters, enclosing copies of this report, were addressed to the local Board of Health and to the superintendent of the Oneonta Light and Power Company, urging that steps be taken to obviate the possibility of any discharge of gas wastes into the Susquehanna river and thereby prevent the occasional nuisances due to odors from the gas wastes.

PIERMONT

ALBANY, N. Y., *September* 14, 1910.

THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report that on September 8th I visited Piermont, Rockland county, for the purpose of making an investigation of the alleged nuisance due to the maintenance of a dump of beater wastes by the Piermont Paper Company within reach of tide water, and to the discharge of sewage into a cove located near the property of Mr. Clarence G. Tilt.

A complete investigation was made last year by one of the engineers of this Department and reference to the report of Mr. Theodore Horton, chief engineer, dated November 8, 1909, gives the salient features of this case. No beater wastes have been dumped within reach of the water for almost a year but the old dump has not been removed and the action of the waves and tides breaks off small lumps of this waste and carries them into the cove in question. The amount of the material carried into the cove can not be very large, and, as this matter is entirely non-putrescible, it can not give rise to any nuisance in itself. The complaint by Mr. C. G. Tilt, that the material absorbs the sewage discharged into the cove and thus retains it, allowing it to putrefy in the cove, is not based on any reasonable foundation. The amount of material is too small to have any appreciable affect and the cove is of such a nature as to retain sewage for an indefinite period. No nuisance can therefore be attributed to the presence of beater wastes in the cove. Mr. John Muirhead, superintendent of the Piermont Paper Company, stated that an extension

eighty guests, and is owned by P. Smith of Horicon and operated by H. W. Stewart of New York city.

The Palisades hotel is located about midway up the lake on the western shore. The present building has been located on the present site for about three years and is owned and run by Margaret and William Owen. This hotel has a maximum capacity for accommodating ninety-two guests and has an average of seventy-five guests during the summer.

There are three large cesspools in connection with the Palisades. These cesspools are all connected but are not provided with overflow pipes.

The first cesspool is located about 50 feet from the lake and is 14' x 13' x 7' deep. The second is about 25 feet from the lake and is 7' deep and has an area of 282 square feet. The third cesspool is located about 15 feet from the lake, is 5' deep and is 25 feet long by 8 feet wide.

These cesspools are inadequate as to capacity to care for the sewage as shown by the fact that the last cesspool had overflown into the lake a short time before the time of the inspection and several loads of sand and gravel had been deposited near the break in order to cover up the filth caused by the discharge.

While all the hotels and cottages cut their ice supply from the lake the water of the lake is not used for domestic purposes as far as could be ascertained, except for washing, bathing and laundry purposes. The water used for drinking and cooking is supplied from individual springs and wells.

In conclusion, I would say that while the amount of sewage that reaches the lake from cesspools along its shores is comparatively small and would probably not endanger the health of the people living along the lake, at all times, contamination and pollution of the lake nevertheless exists inasmuch as sewage or cesspool effluent reaches the lake at least occasionally from one hotel and one summer house and continually from two of the hotels during the greater part of the summer.

It appears, therefore, that danger of contamination is always present and inasmuch as no permits have been issued by this Department to the owners of these places allowing the discharge of sewage or sewage effluent into this lake, any such discharge into the lake is in direct violation of section 76 of the Public Health Law.

I, therefore, recommend that letters be addressed to the proprietors of the hotels and to G. W. Van Slyke informing them of their violation of the Public Health Law insofar as they are discharging or allowing the discharge of sewage or sewage effluent into Brant lake without permits from this Department and advising them to either enlarge their present means of sewage disposal or if conditions permit to provide for supplementary treatment of sewage, such as subsurface irrigation or sand filtration, and further that if the conditions complained of are not remedied the complainants be advised to bring the matter to the attention of the local board of health, which has full power and authority under the Public Health Law to compel an abatement of the insanitary conditions now existing.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

On September 30, 1910, letters, inclosing copies of this report, were addressed to Mr. G. W. Van Slyke and to the hotel proprietors, calling their attention to their violation of the Public Health Law by the discharge of sewage from their premises into Brant lake and urging them to provide for adequate means for sewage disposal so as to improve the sanitary conditions by preventing the discharge of sewage into the lake. The proper method of caring for the sewage from their properties was outlined in a general way and they were advised to secure the services of a competent engineer to work out the details of the design of any system adopted.

INVESTIGATION OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

INVESTIGATION OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

Although the pollution of streams is, generally speaking, responsible for the larger number of what may be considered serious nuisances, there are on the other hand a great many nuisances arising from other sources which must be investigated. Many of them are of minor importance, many are of a more private than public nature, and most of them are directly or indirectly cases of appeal from the action, or more often inaction, of the local board of health.

Frequently these cases can be satisfactorily dealt with through correspondence and the assistance of the local board of health or its representative, the local health officer. These local boards have full jurisdiction to deal with nearly all nuisances in this class and it seems to be generally overlooked or ignored that nearly all of these cases should be dealt with by the local boards and not referred to this Department. When referred to the Department, however, these complaints are always investigated and if sustained are either referred to the local board of health for action if the case falls within its jurisdiction or authority, or they are taken up indirectly by the Department with the party complained of through the local board of health if the case falls partly outside its jurisdiction.

The municipalities of the State where the more important of these nuisances have arisen and have been referred to this Department for investigation and action during 1910, are as follows:

GREENPORT

ALBANY, N. Y., *September* 17, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation made on September 9th by Mr. F. M. Arnolt, inspecting engineer with this Department, of an alleged nuisance due to insanitary conditions in a duck and chicken yard, maintained by Mrs. Anna Pickering at Greenport, L. I.

NORTH SALEM

ALBANY, N. Y., *March* 9, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your instructions to have an investigation made of the complaint recently received from Hon. James R. Howe et al., in regard to insanitary conditions existing near Salem Center, due to the lowering of Titicus reservoir, I beg to state that I detailed Mr. C. F. Breitzke, Assistant Engineer, to make an investigation of the conditions surrounding the reservoir and of the allegations of the complaint on March 7, 1910, and beg to submit herewith the following report in regard to the same:

Titicus reservoir is a part of New York city's water supply. It is located in the town of North Salem, extending east to Salem Center from a point about a half mile east of Purdy's station on the Harlem Division of the New York Central and Hudson River Railroad, forty-seven miles from Grand Central station in New York city.

The dam was completed and the reservoir was put into operation in 1893. The middle or main portion of the dam is composed of solid masonry and contains the gatehouse. The south wing contains a masonry spillway 200 feet long and ends in an earth embankment with a masonry core wall. The embankment of the north wing is formed on the down-stream side by the spur of a hill.

It appears from the 1895 Report of the Aqueduct Commission of New York city that the elevation of the crest of the spillway is 325 feet above sea level. The bottom of the reservoir is irregular, varying to 85 feet at the dam. The reservoir is about 3 miles long and lies in an easterly and westerly direction. It has an area of water surface of 1.1 square miles and a capacity when full of 7,167,000,000 gallons.

Titicus reservoir is located on the Titicus river. This stream has its source in the State of Connecticut and flows in a westerly direction into the Croton river. It has a small watershed of 22.8 square miles, most of which is agricultural land and has been stripped of its woodland. Consequently, the stream is subject to heavy freshets and is reported to frequently run dry in the summer.

At the time of the inspection water was flowing about three inches over the top of the dam and the conditions described in the complaint did not exist. From interviews had with some of the petitioners it was learned that in the late summer and early fall when the water in the reservoir is drawn down that at its upper end mud flats are exposed, which are said to contain numerous stagnant pools which form breeding places for mosquitoes, are unsightly, and give off an unpleasant swamp-like odor.

The interviews with these petitioners, one of them owning land adjoining the upper portion of the reservoir, would indicate, however, that the nuisance was not serious, many of them signing the petition only because they were asked to. In fact, a large number of the petitioners are residents of Purdy's, Croton Falls, Brewster, Goldens Bridge, and other places removed from the immediate vicinity of the alleged nuisance and who have no occasion to travel near it.

In order to ascertain the effect of lowering the water in the Titicus reservoir recourse has been had to a topographical map accompanying the 1895 report of the Aqueduct Commission, from which it appears that if the water in the reservoir were lowered 25 feet an area of about 300 acres would be uncovered, chiefly along the south shore, which is uninhabited and at a distance from the highway, and at the upper end. The slopes in general, however, are fairly steep which should permit of a reasonably rapid drainage and drying up of the exposed area.

The petitioners suggest that the conditions referred to in their complaint can be remedied by building "upper dams that will prevent the making bare the bottom of the reservoir when the water of same is drawn off." While such a dam could be built about a mile from the upper end, its construction

would be a matter of doubtful expediency, for with the very low flow which usually occurs in the Titicus river in the summer time a shallow and stagnant body of water would be created which would cover the now, at times, exposed area, if the reservoir were drawn down. Such a shallow body of water would favor the breeding of mosquitoes and the development of obnoxious and unsightly algae growths which would tend to offset largely, if not counteract, the benefits derived from keeping the area flooded. At best, it is evident that what slight advantage would accrue from the creation of the shallow basin would only be partial, since the main portion of reservoir would be lowered and a considerable area of shores would be exposed as under present conditions of management.

The construction of the dam, as suggested in the petition, is, therefore, in my opinion, a matter of doubtful expediency, in view of the questionable improvement in conditions surrounding the reservoir that might result; but, aside from this question, there are others of graver consideration, such as the right of New York city to utilize the full amount of storage in this reservoir when such use necessarily involves a fluctuation of water surfaces with resulting exposure of shore areas. This latter question is essentially a legal one, but, notwithstanding any complications due to it, I am of the opinion that by careful management of the gates and control of the fluctuations of the water levels in the reservoir an improvement in conditions existing from present management might result.

It is possible that in the drawing down of the reservoir for utilization of storage the rate at which it is done may be so reduced that any extensive area of shores may be given an opportunity for gradual drying before the creation of odors. It is also possible that, if there are small pools formed by the drawing down of this reservoir, these may be avoided by digging trenches or outlets to them, thereby draining them as the water level is reduced.

I should, therefore, recommend that the matter be taken up with the proper New York authorities with a view of having them so modify their method of operating this reservoir and of draining exposed shores along lines suggested above, with a view to improving the sanitary conditions surrounding the reservoir. I believe that this is the tentative step that should be first attempted in removing any objection that results at the present time before any alternative method is attempted, such as that proposed in the accompanying petition, which would involve considerable expense and, as suggested above, may be of doubtful benefit or, at least doubtful expediency, in view of possible slight improvements over existing conditions.

I, therefore, recommend that a copy of this report be transmitted to the New York city authorities having control of this reservoir, with the request that they give the matter their serious consideration, and with a view to carrying out the suggested change in operation along lines suggested above, in order to lessen the objectionable sanitary conditions referred to by the complainants.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

In accordance with the recommendations of this report a letter, inclosing a copy of the report, was addressed to the Commissioner, Department of Water Supply, Gas and Electricity of New York city, on March 16, 1910, urging that such action be taken along the lines suggested in the report as will cause a removal of the conditions complained of.

PORT CHESTER

ALBANY, N. Y., *September* 8, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of reinspection of the sanitary conditions of the so-called Lake street swamp which was located near the Byram river, between Main and Travers streets, in the village of Port Chester, Westchester county:

Numerous complaints having been received by the Department, Dr. Frederick C. Curtis, medical officer, made an inspection of this district, in accordance with your directions, on July 5, 1910, which showed that the conditions existing at that time constituted a public nuisance and a menace to health which should be abated. The local board of health was accordingly directed to co-operate with the board of trustees and urged to take immediate action toward the abatement of the insanitary conditions then existing.

There seemed at first to be some indisposition on the part of the local authorities to abate the nuisance, owing to the fact that a portion of the land in question was State property, inasmuch as it was formerly submerged during times of high tide and the abutting owners had no title to the portion under water. On August 17, 1910, however, the health officer of the village reported that the local board had "accomplished a great deal in cleaning up the territory lying between Main and Travers streets," and that "the results were fairly satisfactory, although not perfect." The health officer also stated in his report that the sum appropriated by the village for this work had been practically used up and that it might be necessary to ask for another appropriation to complete the work.

Another complaint was received by the Department in the meantime stating that, while the village trustees had expended $200 in filling in the ditch or stream which passed through the swamp, this did not at all constitute a removal of the conditions criticised and the Department was asked to take the matter up further.

The reinspection was made by Mr. C. A. Holmquist of this Department, in company with Dr. T. C. Elmendorf, president of the board of health, on August 22, 1910. This inspection showed that practically all of the swampy area which seemed to be caused by the influx of water from the Byram river during high tide, had been filled in with a gravelly loam to an elevation slightly above the level of the adjacent ground, leaving the greater part of the area in a perfectly dry and sanitary condition. Other portions which could not be reached with the filling material without removing the buildings were being drained into an adjacent manhole on the line of the sewer system by means of drain pipes.

One of the barns which was formerly located over the swamp was being removed, and the president of the board of health stated the area thus exposed would also be filled in.

It appeared from the inspection that the work of abating the nuisance by filling in with soil and draining was being done in a proper and thorough manner and when completed should place the swamp in a sanitary condition.

I, therefore, recommend that the local board of health be urged to complete the work of filling in and draining the entire section, removing outhouses, if necessary, so as to place it in a thoroughly sanitary condition and thereby avoid any further cause for complaint.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer.

In accordance with the recommendations of this report a letter, inclosing a copy of the report, was sent to the local board of health on September 13, 1910, urging them to complete the work of filling in and draining the swamp.

VESTAL

ALBANY, N. Y., *September* 29, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation of an alleged nuisance due to odors from the hogpens and the garbage boiling plant maintained at Vestal, N. Y., by Mr. George W. Mosher.

Mrs. C. C. Morse of Vestal, N. Y., recently made a complaint to this Department of insanitary conditions at this point and on September 24th, Mr. Fritz M. Arnolt, inspecting engineer with this Department, visited Vestal and examined into the conditions there.

Mr. George Mosher maintains some hogpens and a garbage boiling establishment at Vestal, N. Y. There are five or six houses within a hundred yards of this plant. The pens contained fifty-seven pigs, most of which were young. The pens were clean and no piles of manure were visible. It was raining heavily at the time of the inspection and only a slight odor could be detected in the yards. It is very probable, however, that on warm, humid days a serious nuisance due to odors from the yards would exist.

Mr. George Mosher feeds his pigs on garbage which he boils in an open shed on his property. This garbage he obtains from Binghamton, and carries it in barrels to his place and boils it in a large iron pot about three feet in diameter and two feet deep. At the time of the inspection Mr. Mosher was absent and no foodstuffs or garbage was being boiled. Considerable odor, however, was present and the shed swarmed with flies. During boiling the pot is evidently covered with the loosely constructed wooden cover which was standing nearby. Three kegs and two pails of grease or fats were standing in the shed. This had evidently been skimmed from the boiled garbage. Four barrels partially filled with garbage were standing just outside of the shed. This garbage consisted of fish, meat, eggshells, fruit, potato peelings and vegetable wastes. It was thoroughly wetted down by the heavy rain falling at the time and did not give off any disagreeable odor. Although at the time of the inspection no foodstuffs or garbage was being boiled and no odor that could be characterized as a nuisance to the neighboring dwellers was present, it is very probable that at the time the garbage is being boiled, especially on warm, humid days, a serious nuisance due to odors exists.

No garbage, bone or animal boiling or rendering occupation should be carried on in any establishment not provided with air-tight walls, impervious floors and such facilities as will enable all operations to be carried on with all cleanliness and freedom from all offense and nuisance. The plant at Mr. Mosher's place is crude with no such facilities and will naturally give off considerable odor while in operation. Moreover it is in close proximity to habitation and any odors at the plant or from the pens and yards will quickly create a nuisance in the neighborhood.

The heavy rain falling prevented the detection of any nuisance at the time of the inspection, but the conditions at the place were such as to give rise to a serious nuisance under less favorable conditions. I should recommend that the board of health of the town of Vestal take such action as may be necessary to remedy the conditions existing at the plant so as to prevent any nuisance.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

In accordance with the recommendations of this report a letter, inclosing a copy of the report, was sent to the board of health of the town of Vestal on October 10, 1910, urging them to give the matter their careful attention.

WATERVLIET

ALBANY, N. Y., *April* 4, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your request, I beg to say that on March 31, 1910, I made an inspection of the sanitary condition of Dry river and its tributaries in the city of Watervliet in connection with the proposed project of the city for the improvement thereof by a system of storm drainage and reservoir control, and beg to submit herewith the following report.

On the date above mentioned I met by appointment Dr. J. W. Burns, health officer, Mr. John Browne, chairman of the citizens' committee, and Mr. F. J. Keis, engineering representative of the firm of Solomon-Norcross Co., of Atlanta, Ga., and in company with them made an inspection of Dry river and Gas House creek, a tributary thereof, inspecting carefully the sanitary condition of the bed and banks of these watercourses, and had pointed out to me on the ground the alignment of the proposed storm drains which are to convey to the Hudson river the waters from this catchment area during ordinary and flood flows. I inspected also the condition of culverts, the points of discharge of sanitary sewers now discharging into these watercourses and visited and inspected the proposed site of the lower reservoir which it is proposed to impound and control the flow of Dry river during times of freshets and flood flows.

Dry river is a stream which rises in the town of Colonie, entering the city of Watervliet at its westerly boundary (near Twenty-fourth street), and flows generally easterly through the city to Fourth avenue, thence southeasterly to its crossing under the Erie canal near Thirteenth street; thence easterly to the Hudson river. A smaller tributary called Gas House creek rises also in the town of Colonie and enters the city at its western boundary near Fifteenth street and joins Dry river near the intersection of Nineteenth street and Fourth avenue.

The drainage area of Dry river, including all tributary drainage areas, is about five square miles. The topography of the upper portion of drainage area west of the city line is rather precipitous, is mostly denuded of woodland and the character of the soil is partly rocky and relatively impervious. The portion within the city limits is somewhat more flat and a considerable portion of it lies in the more thickly settled section of the city, having, with paved streets, etc., a relatively impervious surface.

It is evident from the topography and character of the Dry river catchment area that it is a stream that may be classed as flashy, one subject to excessive flood flow during freshet season and to extreme low flows during the dry season of the year. The result of these excessive or abnormal conditions are evidently and very apparently reflected in the conditions which are actually found to exist along and adjacent to the streams during different portions of the year. Thus in the late winter or early spring when rains and melting snow bring down the precipitation from all parts of the watershed, the flooding of the streets and areas adjacent to the streams is excessive, large areas being inundated and the cellars and ground of adjacent properties so flooded as to make them untenantable. Further than this the culverts and other stream crossings were found to be narrow or constructed in cross section, and this congestion gives rise to a series of ice gorges which still further heighten the flood conditions.

Again, the low flow during the dry summer season gives views to a very insanitary condition along the course of these streams. It was found that a number of sewers and old drains discharge their contents into these watercourses at various points, especially at the culverts built at street crossings. Many privies are located adjoining or very close to the banks where seepage adds additional sewage pollution. The stream throughout almost its entire course within the city limits is, further, used as a dumping place for garbage refuse and, I was informed, carcasses of dead animals.

It was very evident, therefore, from the results of my inspection of these streams, the topographic and hydrographic conditions described above, that sanitary and flood conditions of these streams should be at once improved. While the sanitary conditions are perhaps more important from the standpoint of health, there can be no question that the removing of flood conditions is very greatly needed since they affect indirectly the health of the citizen in so far as they make hazardous and untenantable the dwellings along the streams during these flood times.

The proposed improvements of the conditions of this creek, according to the plans and report of the consulting engineer, Solomon-Norcross Co., comprise:

1. The construction of two reservoirs on the upper reaches of Dry creek for the storage and control of the flood water.
2. The construction of masonry storm drains leading from the lower reservoir and from a point in Gas House creek near Eighteenth street and Avenue A through the built-up portion of the city with outlet into the Hudson river at a point on line of extension of Twenty-first street for the conveyance of the waters impounded in the reservoirs and the waters which fall upon and flow naturally from the catchment area below the impounding reservoir.
3. An abandonment and filling in of the present creek along the line of these storm drains.

Without attempting to discuss the details of the proposed method and plans of improvement it may be said that this method of storm regulation is one which is frequently and effectually employed in similar cases elsewhere and is in accordance with good engineering practice. There are many features and details which involve careful design and expert judgment, but it is my opinion that this method is one appropriate to apply to this case, and that if the capacities of the reservoirs and of conduits have been carefully worked out and the works are well constructed and properly maintained there can be little question that the objectionable sanitary and flood conditions along these streams which now exist will be entirely removed.

Attention should be called to additional measures which should be carried out in the near future in connection with these improvements in the way of intercepting and disposing of indeoendently the sewage which now discharges into these creeks. It is assumed that these storm drains are not planned to receive sanitary sewage and it is important that they do not; since with conduits conveying sanitary sewage the provisions of the Public Health Law provide definite procedure which is not being followed out in this case.

In view of the foregoing it is my opinion that the conditions in and along Dry creek and Gas House creek resulting from the flooding of the banks and adjacent territory and to the discharge and dumping of sewage, garbage and refuse into them constitute a public nuisance and a menace to health which should be removed and remedied at once; and I accordingly recommend that a copy of this report be furnished the city authorities and that they be urged to undertake and complete the improvements now contemplated at the earliest possible time.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

On April 6, 1910, letters, inclosing copies of this report, were addressed to the city authorities of Watervliet urging them to carry out the contemplated improvements at the earliest possible time.

In addition to the foregoing, nuisances were examined into in some cases and advice was given through correspondence in other cases in the matter of abatement of nuisances at the following places:

Akin.
Albion.
Athens.
Aurelius.
Aurora.
Baldwinsville.
Ballston.
Batavia.
Brocton.
Brooklyn.
Callicoon.
Canaseraga.
Cato.
Catskill.
Cheektowaga.
Clarks Mills.
Clarksville.
Clifton.
Cohoes.
Coxsackie.
East Syracuse.
Euclid.
Fair Haven.
Fayette.
Fayetteville.
Fishkill Landing.
Franklinville.
Freeport.
Friendship.
Fulton.
Geneva.
Greece.
Harrison.
Hensonville.
Hermon.
Highland Falls.
Hornell.
Hudson Falls.
Huntington.
Hyde Park.
Jordan.
Lewiston.
Lyndonville.
Malone.
Mamaroneck.
Marcellus.
Matteawan.
Milford.
Montour Falls.
Mt. View.
Newburgh.
New City.
Newfane.
New Rochelle.
Oneonta.
Oriskany.
Ossining.
Peekskill.
Penn Yan.
Port Henry.
Port Jervis.
Red Hook.
Rensselaer.
Rhinebeck.
Ripley.
Rockland Lake.
Rome.
Rosendale.
Schenectady.
Schuylerville.
Seneca Falls.
Sharon Springs.
Sheridan.
Silver Springs.
South Nyack.
Somers Center.
Stillwater.
Stony Ridge.
Syracuse.
Tarrytown.
Troy.
Tuckahoe.
Tupper Lake.
Varick.
Walton.
Wheatfield.
Whitehall.
Yonkers.

INVESTIGATIONS ORDERED BY THE GOVERNOR

INVESTIGATIONS ORDERED BY THE GOVERNOR

Section 6 of article I of the Public Health Law provides that whenever required by the Governor of the State the Commissioner shall have the power and shall make an examination into nuisances or questions affecting the security of life and health in any locality of the State. Although, strictly, no executive orders were issued under this provision of the law, two investigations and reports were made at the request of the Chief Executive, one in relation to the prevalence of typhoid fever in the State, and one in reference to the reconstruction of the Bird Island pier outfall sewer in the city of Buffalo.

The first of these investigations and reports was requested by Governor White during the month of October, and since at this season of the year typhoid fever is normally more prevalent this investigation afforded an opportunity of emphasizing the fact well understood by sanitarians but not by the public at large, that there is normally a very marked seasonal variation in the prevalence of typhoid fever during the year. That this fact is not generally understood or appreciated was evident from the apparent feeling of anxiety entertained by the public and freely circulated through the press that typhoid fever was unduly prevalent throughout the State, and in certain localities or municipalities this feeling reached a state of real alarm. The results of this investigation showed very clearly, however, that through the State as a whole, typhoid fever during 1910 was some 10 per cent. less prevalent than the average for the ten-year period immediately preceding, notwithstanding that in some districts of the State its prevalence was in excess of the normal. Incidentally the results also illustrate the false anxiety or alarm frequently evidenced by the public concerning a strictly scientific matter when important facts and a knowledge of the subject are lacking.

TYPHOID FEVER, SYRACUSE

STATE OF NEW YORK

EXECUTIVE CHAMBER

ALBANY, N. Y., *October* 13, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

MY DEAR DOCTOR: — The prevalence of typhoid fever in the State, and especially the number of cases in Syracuse, has been a subject of anxiety and some alarm to me. I have noted from week to week in the public press the apparent growth of the trouble.

I have been very glad to observe that your Department has been active in investigating the causes of this contagion, and I wish you would let me hear from you, giving me your conclusions as to the source of the trouble and as to the probable outcome.

I am especially anxious to know what you think of the condition in Syracuse, and where you think the disease comes from. It is unnecessary, I am sure, to ask you to make every proper effort to ascertain the causes and to see to it that every safeguard to the public health is provided.

With kindest regards, I am,

Faithfully yours,
HORACE WHITE.

ALBANY, N. Y., *October* 14, 1910.

Hon. HORACE WHITE, *Governor of the State of New York, Albany, N. Y.:*

SIR: — I have the honor to acknowledge receipt of your communication of October 13th, to Commissioner Porter, relative to the prevalence of typhoid fever in this State, and especially in the city of Syracuse.

Doctor Porter is to-day lecturing at Cornell University, and I will immediately transmit the contents of your communication to him.

Regarding the Syracuse situation, I might add that the health authorities asked this Department for aid this week, and a man has been detailed to study the situation there for as long as may be necessary. A full report on this matter will be furnished you without delay.

Very respectfully,
ALEC H. SEYMOUR,
Secretary

ALBANY, N. Y., *October* 26, 1910.

Hon. HORACE WHITE, *Governor of the State of New York, Executive Chamber, Albany:*

SIR: — I beg to transmit herewith the report of the Department on the prevalence of typhoid fever in this State, and especially in the city of Syracuse, as requested by you. Copies of this report have been transmitted to the mayor of Syracuse and also to the health officer, with the suggestion that a conference be held without delay between the officials of the city and of this Department regarding the situation.

I beg to assure you of my active interest in this matter, and my desire to make this Department of as much service as possible to the city.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

ALBANY, N. Y., *October* 25, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — In accordance with your directions, I beg to submit the following brief report of an investigation of the prevalence of typhoid fever in the State of New York, with special reference to the prevalence of typhoid fever in the city of Syracuse.

It is unnecessary to state that a study of such a comprehensive nature could hardly be made briefly and at the same time with much detail, and I have consequently given, in connection with the statistics for the State, the results only for the "sanitary districts" into which the State has, for the purposes of convenience, been somewhat arbitrarily divided. In the case of Syracuse, however, both the study and my report have been made in greater detail.

In order to present in concise manner the prevalence of typhoid fever in the State I have taken the record of statistics of the Department for typhoid fever for the past ten years from 1900 to 1909, inclusive, and tabulated them in such form as to show the relative prevalence of the disease during the months of 1910. Since the records for 1910 can obviously be secured for only a portion of the year it was necessary in this study to tabulate these statistics by months in order that a monthly comparison can be made of the prevalence of the disease for the months during 1910. In addition to the reason for this method of tabulation and comparison is the important reason that the occurrence of typhoid fever in general follows a reasonable distribution, being greater than the average during the late summer and fall months of the year, and less during the late winter and spring months of the year.

In order to show more forcibly the seasonal variation in the prevalence of typhoid fever the following summary of the mortality statistics for typhoid fever by months for the entire State for the period from 1900 to 1909, inclusive, together with the statistics for each month of 1910, so far as these statistics are available, is given below:

MONTH	Average 1900 to 1909 inclusive	1910	MONTH	Average 1900 to 1909 inclusive	1910
January	126.6	87.0	July	106.2	94.0
February	107.1	87.0	August	153.9	131.0
March	108.2	92.0	September	192.6	183.0
April	94.4	68.0	October	212.2	......
May	92.0	63.0	November	170.5	......
June	74.4	70.0	December	156.1	......

From these statistics it is evident that the normal variation of typhoid fever during the year is quite marked and follows the general law stated above. It is further seen that mortality from typhoid fever for the State during 1910 is appreciably below the average for the last ten years, and for the past three months for which statistics are available, namely, July, August and September, is approximately 10 per cent. less than the normal for this ten-year period.

Considering now more in detail the prevalence and distribution of typhoid fever throughout the State, I beg to say that I have made similar comparisons by "sanitary districts" and have subdivided the mortality statistics in two groups, showing respectively the typhoid fever in the cities and in the district outside of cities, representing respectively the urban and rural population. Without giving in detail the statistics I find the following facts in regard to each district, presenting the same in the form of a table showing for each district by plus or minus sign whether the typhoid fever during the past three months in 1910 is, in each, above or below the average, or normal, typhoid fever rate for the corresponding months of the period from 1900 to 1909, inclusive:

	Urban	Rural
Maritime district	—	+
Hudson Valley district	—	—
Adirondack and Northern district	+	—

	Urban	Rural
Mohawk Valley district	—	—
Eastern Central district	+	+
Western Central district	—	—
Lake Ontario and Western district	—	—
Southern Tier district	+	—

It will be seen from the above table that in the rural population of the State typhoid fever was in excess in only two districts, namely, the Maritime and the Eastern Central districts. It was found that in both these districts the excess was appreciable. In the Maritime district it amounted for the past three months to some three times the normal, while in the Eastern Central district it amounted to an excess of about 60 per cent., and this excess seemed to occur in two adjacent townships in Delaware county.

It will be further seen from this table that in the cities of the State typhoid fever has, during the past three months, been in excess of the average for the corresponding months of the past ten years only in three districts, namely, the Adirondack and Northern, the Eastern Central, and the Southern Tier districts.

It was found further that of these districts only in the case of the Eastern Central district was typhoid fever appreciably in excess. The Eastern Central district includes the cities of Cortland, Oneida, Syracuse and Oneonta, but only in the case of Syracuse was typhoid fever in excess. In the remaining two districts, namely, the Adirondack and Northern, and the Southern Tier districts, typhoid fever was in excess in seven out of eleven of the cities, but the excess was in general so slight as to make it relatively unimportant as to its significance.

While the above is a correct representation of typhoid fever in the cities of the State, by sanitary districts, two notable exceptions to the general rule should be noted, viz.: In the case of Yonkers and Niagara Falls in the Maritime, and the Lake Ontario and Western districts, respectively, in each of which the typhoid fever is, as with the case of Syracuse, appreciably above the average for the ten-year period from 1900 to 1910, but notwithstanding this excess, which is offset by a decrease in the other cities of the respective districts, typhoid fever in these districts, as a whole, is below the average for the ten-year period. The conditions at Yonkers have only recently been investigated and reported upon by the Department. The case of Niagara Falls, notorious for its high typhoid fever rate, has been repeatedly investigated by the Department, and as a result extensive improvements are under way which should reduce its high rate.

With the above brief outline of the relative prevalence of typhoid fever in the State as a whole for the past three months before us, and considering now more in detail the important question of the undue prevalence of typhoid fever in the city of Syracuse, and of the possible reasons for this prevalence during the present year, and especially the past few months, I beg to say that a special and more detailed investigation and study were made of the conditions at Syracuse. In order to do this visits were made by the chief and assistants of the engineering division, and careful inspections made of the local conditions within the city and upon the watershed of the water supply, which is taken from Skaneateles lake, and of the pipe line leading to the city. A careful study was also made of the reported cases of typhoid fever in the city in order to determine any specific cause to which the present excess of typhoid fever might be attributed. A careful study was further made of the actual conditions of, and of the records available in connection with, the milk supply, water supply and other utilities and conditions which might in any way be factors in the cause of the present undue prevalence of this disease.

From a study of the statistics of mortality and morbidity it was found that during the months of July to September, inclusive, there was an excess of typhoid fever in the city of Syracuse amounting to from two to three times the average or normal for the three corresponding months for the period of 1900 to 1909, inclusive. Although the *mortality* statistics are more reliable in regard to the determination of the prevalence of typhoid fever in any

municipality the study of occurrence of *cases* is of much greater assistance in the determination of the causes for it, and accordingly a graphical study was made of the distribution of cases which have occurred in the city during 1910. This study comprised the charting upon a map of the city by means of colored tacks the location of all cases of typhoid fever during the present year.

This picture of the occurrence of cases of typhoid fever in the city during the year was very instructive and showed at once that the cases were, with the exception of one district, rather uniformly proportional to the distribution of population within the city, the exceptional district referred to being the one bounded approximately by Grape street, Burnett street, South street and East Genesee street. This district, as familiarly known to local residents, is one in which the general sanitary conditions are far from being satisfactory, and which might be considered a fertile soil for an outbreak of any communicable disease should this district once become seeded or infected.

With these facts before us, then, namely, an undue prevalence of typhoid fever, amounting to from two to three times the normal, with the cases scattered over the city with general proportionality to the density of population, except for one contracted area within the city where the typhoid appears to be in secondary excess, let us now inquire into the actual extent and importance of these cases of typhoid fever which have occurred during the present year, and as to the possible causes of this general, undue prevalence of this disease and of the secondary excess in the small district referred to.

As was stated above, the prevalence from typhoid fever during, say the past three months, was some two to three times the average or normal for the corresponding months of the period from 1900 to 1909, inclusive. It was, however, only about 20 per cent. greater than the typhoid fever rate in the year 1900 and twice what it was in the year 1901. Expressing it as an absolute rate of mortality, and allowing for seasonal distribution, we may say that the mortality rate during the last three months in Syracuse corresponds to a yearly mortality rate of approximately 40 per 100,000.

This rate, while relatively excessive for the city of Syracuse, is considerably less than the mortality rate which is yearly experienced by many cities in the country at large and a few within the State.* In other words, I wish to emphasize that whereas the typnoid fever at Syracuse is some two to three times the normal for the city of Syracuse, it cannot be considered in any sense as approaching epidemic proportions; nor do I wish it to be inferred that the excess is not sufficiently great or of sufficient importance to be disregarded. It is in fact sufficient to cause deep concern if not alarm to the city authorities until the cause for this increase is found and measures taken to suppress it.

In searching for the cause that has given rise to this excessive rate, careful consideration was given to the various general causes which, from the broad standpoint of epidemiology, are usually found to be responsible for the excessive typhoid fever in any locality. These include a study of the water supply, milk supply, ice supply, uncooked foods, oysters and other shell fish, as well as of a series of more remote causes generally classified under the head of secondary infection such as contact of persons, infected clothing or foods, and through such agencies as insects, more especially the insidious domestic fly, now commonly known as the "typhoid fly."

Although a thorough investigation of the milk supply was impracticable, owing to limited time and services available for this investigation, a careful study was made of the relation of the various milk supplies to the cases which occurred in the city. The milk is supplied by one large dairy company and a considerable number of smaller companies or individuals. The typhoid fever report cards of all cases were carefully reviewed and compared among the various milk supplies and there was found to be no particular relation between any dairy or dealer with any appreciable number of cases. It is true that approximately thirty of the 200 cases in the city, representing approxi-

*Compare with Oswego 44; Poughkeepsie 45; Rensselaer 73; Watervliet 57; Dunkirk 40; Lockport 57; Cohoes 90; Corning 42; Niagara Falls 135; Watertown 77; Hudson 64, and Ogdensburg 59.

mately 15 per cent., consumed milk from the large dairy company referred to, but it was found that this dairy company supplied approximately 15 per cent. of the milk consumed in the city. In other words, this dairy company had only its proportional share of the cases in the city. The amount of milk supplied by the other dairy companies and the number of cases occurring on their respective routes were too small to establish any close relationship, although in no instance was any excess of cases found in connection with any milk supply or milk route.

In view of this lack of association of cases with any particular milk supply, and in view of the very explosive nature of a typhoid fever outbreak which is always apparent where milk is the inciting cause, there can be little question in my opinion that in the present instance the milk supply is not primarily responsible for the undue prevalence of typhoid fever in Syracuse.

Although the information furnished by the typhoid fever report cards on file with the local board of health does not contain the information in such detail as would be desired, or as could be secured from a case to case investigation, the information that was furnished did not point in any way to any particular or general supply of ice, uncooked vegetables, oysters or other shellfish. These factors could not, therefore, be considered as responsible for any appreciable or undue excess of typhoid fever.

Under the classification of "secondary infection," however, there was found to be a condition in the section of the city referred to above, bounded by Grape, Burnett, South and East Genesee streets, where these infective influences were active, for in this section there was found an excess of some twenty-five cases above the normal excess, which could only be accounted for by the insanitary conditions and practices found in this district. For example, this district is a residential district of the poorer classes, where ignorance of sanitary principles was apparent. Insanitary privy vaults exposed to the action of flies were very numerous. The general sanitary conditions of the premises were also very poor and to the epidemiologist the sanitary condition of this section presented a picture which could only be considered a fertile soil for the growth and dissemination of typhoid fever infection when once seeded.

Discounting, however, the secondary excess of typhoid fever in this district, which amounted to say approximately twenty-five cases, there still remains an excess of typhoid fever over the entire city almost equal to that if these twenty-five cases were included. In other words, with adequate allowance for this secondary increase of typhoid fever, presumably resulting from the seeding of this section from the primary cause, there still remains this primary cause to be accounted for.

I have so far considered all of the more common causes or channels of infection which are usually responsible for the occurrence of typhoid fever in any locality with the exception of the water supply, and a most careful consideration must now be given not only to the facts in connection with it but to the evidence deduced from these facts.

The water supply of Syracuse is taken from Skaneateles lake, at a point about one mile above the outlet, the intake being in about thirty-five feet of water, and the water delivered to the city through two lines of pipe leading to distributing reservoirs within the city and the distribution system. The village of Skaneateles is located at the northerly or outlet end of the lake and is provided with a sewerage system. At the upper end of the lake, some fourteen miles from the intake, is located the village of Glenhaven, which is provided with a sewage disposal system. Along the shores of the lake are a number of cottages, which in general are provided with local or individual means of disposal of household wastes.

The lake and watershed of Skaneateles tributary thereto are protected by "Rules and Regulations" enacted by the State Department of Health, and a system of sanitary patrol is exercised over the lands adjacent to the waters of the lake for the purpose of preventing any pollution or violation of the rules. Although protection is thus afforded by these rules and a sanitary patrol, and notwithstanding that this sanitary patrol is exercised in a fairly satisfactory manner, there can be no question that the waters of this lake are

subject to some pollution; and although this pollution cannot at present be considered as serious, we cannot ignore the fact that it does occur.

An inspection and careful inquiry was, therefore, made of the sanitary conditions around the lake by the assistant engineers of the Department, and it was found that pollution occurred from two specific sources. One of these is the pollution incidental to all lakes or bodies of water of this nature where a resident population exists on any portion of the watershed; and although only one direct source of pollution was found near the intake, namely, a sewer drain discharging into the lake, it must not be forgotten that pollution from surface washings, from occasional bathing and from boats and pleasure craft must occur, and this notwithstanding a satisfactory enforcement of the water rules and of a sanitary patrol of the watershed.

Perhaps one of the most serious features in connection with this pollution is that resulting from the use of a small craft owned and operated under the water board authorities for the removal of excreta by the pail system which is in operation at the various cottages along the shores of the lake. To manage and operate in a sanitary manner free from any danger such a system of collection of excreta in connection with a lake supply is a very serious problem. In practice this boat must travel periodically if not regularly from one end of the lake to the other, collecting pails of excreta in all kinds of weather and with unskilled labor, and it is not a simple matter to perform these duties without at times having some of the excreta spilled into the lake or washed from the boat during times of rain. It is found that at some cottages it is necessary to bring the pails of excreta on board this vessel by means of a rowboat. If occurring during windy or stormy weather this might add to the danger and amount of such excreta reaching the waters of the lake. Furthermore, it was learned that at least on one occasion recently an employee was discharged for carelessness in the handling of these pails of excreta.

We cannot afford, therefore, to ignore that from a practical standpoint a small amount of pollution must reach the waters of the lake, and if we study the records of chemical and bacteriological analyses of the lake water which are made by the city and which are fortunately available, we find this small pollution reflected in the results. These results of regular and special investigations that have been made by the city bacteriologist show clearly that whereas fecal pollution does not in general exist regularly except along the immediate shores of the lake, and that only at times does it reach out as far as the intake, they show that on one or two occasions this pollution has reached the intake and under conditions which one would expect it might occur. It was found, for instance, that following strong southerly winds colon bacilli were found in the higher dilutions at the intake, resulting undoubtedly from the well-known phenomena that an undertow takes place which carries pollution, in this case from the shores in the vicinity of Skaneateles, by means of subcurrents out into the lake. It was found also that following northerly winds pollution extends out toward the intake, due to the blowing of the surface currents out toward the intake.

I do not wish to be understood as stating that the pollution which does at times and may in the future reach the intake, is in great amounts nor in general as to classify the waters of this lake at the intake as among those that are unsafe. I do wish to point out, however, that pollution in small amounts does occur and that if perchance it is of infectious origin its presence is an actual danger. It is for this reason that in some countries, such as Germany, where central health authorities have control over all water supplies, the filtration of all surface supplies is required.

Coming now to another phase of the water supply situation, I wish to point out that during the past two years the city of Syracuse has been laying a new water conduit from the lake to the city. This auxiliary main, which parallels generally the old main, was completed and first put in use in February, 1910. I am informed that this main was thoroughly flushed by allowing the water to flow freely through it for a number of days before it was diverted into the distribution system. There can be little question but that this main was thoroughly cleansed and that any infectious material remaining in the pipe resulting from the labor operations during construction must have been

thoroughly washed out, for no excess of typhoid fever in the city was apparent during the few months following the use of this new main.

Particular attention, however, should be called to the fact that during the past summer and up until very recently three cross-connections between the old and new mains have been under construction. This construction was done by laborers employed under the water bureau, and during this construction it was necessary at times to shut off the supply and to drain the pipes. The significance of having a gang of laborers working inside and outside of a live water main during the prolonged period of months of construction, and of shutting off and draining the pipes cannot be overlooked, for the possibility of contamination under the conditions is apparent to any close student of sanitation. For instance, it might be possible for fifty laborers to be working promiscuously in and around construction of this nature without contaminating the inside of the pipe with the specific germ of typhoid fever. One careless workman, however, who might have been in close contact with a typhoid fever patient, or who might otherwise have gotten infected material on his hands, feet or clothing, or who might be a bacillus carrier, might under the same working conditions readily infect the supply as to produce an appreciable increase in the typhoid fever rate of the city. Especially it must not be forgotten that such contamination of the principal water supply main of a city, in active use, is very different from the contamination of a stream or river from which a city may take its supply, for in the former all of the water is consumed by the city, whereas in the latter case only a small percentage of it may be consumed by the city.

Again, if these pipes were at times shut off, and drained, it is possible that pollution from adjacent soil, either in the village of Skaneateles or at points along the pipe line where laborers camps were located, might have entered the mains through leakage.

Enough has been said in regard to the possible contamination that might have occurred to the water supply of the city of Syracuse in the past three months to account for the undue prevalence of typhoid fever that has existed during this interval. Owing to the difference in these two possible sources of infection, namely, the pollution of the lake water in the lake itself and the possible contamination of it along the pipe lines after its entrance into these lines, it is almost impossible to state which one was responsible. The fact that typhoid fever is so much in excess of what it has been in any one of the past few years when we know that better sanitary patrol has been practiced, would lead to the conclusion that the recent prevalence was due more to the possible infection of the mains during the work of construction, and the filling and draining of these mains incident thereto.

One fact which should not be overlooked in the typhoid fever situation is that the city of Syracuse has recently had under construction a considerable amount of sewers. Construction of this nature should not and rarely is the cause of any outbreak of typhoid fever, although under certain conditions it may be. That it was not in the present case is apparent from the distribution of cases through the city, which show no localized prevalence of the disease in the sections of the city where sewers have been constructed. Indeed, the picture presented by the typhoid fever chart is one which the epidemiologist would characterize at once as a "water supply" case, and since all other influences and factors have been carefully considered and the evidence in regard to each carefully weighed showing their exclusion, there can be little doubt left as to the water supply being the primary cause.

While reaching this conclusion as to the responsibility of the water supply in the causation of typhoid fever at Syracuse, two facts should, however, be clearly kept in mind. One is that the principal source of trouble was in all probability largely, and possibly entirely, an infection of this supply after it entered the pipe line and that the sanitary conditions around the lake, though still far from perfect and, therefore, subject to improvement, may have been only an incidental factor. The other fact is the practical difficulty of maintaining any surface water supply in a condition entirely free from pollution unless the watershed is owned outright and controlled by the municipality. Indeed, this difficulty amounts in some cases to almost an impossibility and

the best that can be done in such cases, in the absence of corrective measures such as water filtration, is to keep the sanitary conditions on the watershed so carefully patrolled as to reduce this pollution to a practical minimum.

Much credit should be given the Syracuse officials for the efficient measures which they inaugurated some years ago, and have since considerably improved, in the sanitary patrol of Skaneateles lake. In fact, I know of no similar body of water in this State, used for water supply purposes, where a sanitary patrol is so rigidly and effectively carried out. When we admit, then, that the conditions around Skaneateles lake are not perfect, it is in no sense a reflection upon the efficiency or conscientiousness of the city officials responsible for the sanitary patrol of its watershed.

There remains now to be considered the preventive measures that should be carried out by the city in order to suppress the present prevalence of typhoid fever and to strengthen the barriers around their water supply so as to prevent any further recurrence of the present trouble; and in view of the facts and evidence presented above, I beg to make the following recommendations:

1. That in case any future construction or changes are made in the pipe lines leading from Skaneateles lake to the city or in the distribution system, that the most cautious and rigid sanitary supervision be made of the manner in which the work is done, of the surroundings adjacent to the construction, and of cleanliness and deportment of the laborers during their work.

2. That the one sewer found by our inspection and possibly others which discharge sewage into the lake in the vicinity of the intake, be cut off at once and every precaution taken to find and remove any other sources of direct or indirect pollution of the lake water, especially in the vicinity of the intake.

3. That the boat system of collection of excretal matter along the lake be abandoned and that in its place a land system of removal of excreta be substituted.

4. That aggressive and effective action be taken by the local board of health in a general sanitary cleaning up of the section in the city referred to above as being the cause of a secondary excess of typhoid fever in the city.

5. That unless there is an immediate cessation in the occurrence of typhoid cases in the city, above what may be normally expected, resulting from a residual infection, possibly remaining in the reservoirs and distribution system, that a general notice, or warning, be issued to the residents of the city to boil all water, or at least that used for drinking, until further notice.

In matter of the sanitary quality of the Syracuse supply, which must necessarily be of vital interest to the people and officials of the city of Syracuse, I wish to point out clearly that this water supply is a surface supply taken from one of the Finger lakes, as in the case of the cities of Auburn and Geneva; that in the case of the latter two lake supplies the conditions of pollution upon the watershed incident to the population along the shores and tributary watercourses have reached a point where a further protection of these supplies by water purification has become necessary and steps are being taken to provide for it; and that whereas the pollution of Skaneateles lake has not at present by any means reached a similar degree of danger requiring filtration of the supply, it is obvious that this requirement for further protection by filtration or other means of purification must ultimately come and at no very distant time.

I am, however, of the opinion that if additional barriers are established against a pollution of Skaneateles lake and its tributaries and if the water rules and regulations enacted by the State Commissioner of Health for the protection of this supply are rigidly enforced, the city of Syracuse may with reasonable safety still use this lake water without filtration for some years to come. There will, of course, with an unfiltered surface water supply having a resident population on the watershed, always remain some danger of in-

fection, if from no other sources than that of accidental or wilful contamination by careless or incompetent parties.

For the reason thus stated, the question of ultimate necessity for filtering this supply should be constantly kept in mind by the proper officials having supervision and sanitary patrol of the supply, in order that the time when this filtration is required may be sufficiently foreseen to afford opportunity to raise the necessary funds and carry out the necessary construction of such filtration works.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

BIRD ISLAND PIER OUTFALL SEWER, BUFFALO

ALBANY, N. Y., *October 25*, 1910.

Honorable HORACE WHITE, *Governor, Executive Chamber, Albany, N. Y.:*

DEAR SIR: — In reference to the resolution of the common council of the city of North Tonawanda relating to the reconstruction of the Bird Island pier outlet sewer in the city of Buffalo, a copy of which resolution was submitted to you and at your direction referred to me for attention, I beg to state that I have recently caused an inspection to be made of this work and am inclosing a copy of the report of such inspection, which report together with a letter addressed to the city clerk of North Tonawanda will explain the situation.

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

ALBANY, N. Y., *October* 21, 1910.

Mr, THEODORE HORTON, *Chief Engineer, New York State Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of the works now being carried on by the city of Buffalo in connection with the Bird Island pier outfall sewer of the city sewer system.

This examination was made at your direction on October 15th and was requested by Commissioner Porter in response to a resolution of the common council of the city of North Tonawanda addressed to Governor Horace White and by him referred to Commissioner Porter for attention and on account of a petition from the board of trade of the city of North Tonawanda addressed to Governor Hughes and by him referred to Commissioner Porter for attention, a copy of this petition, as well as a similar petition from the board of trade of the city of Niagara Falls, having also been addressed to Commissioner Porter.

The resolution and petitions above referred to alleged that the city of Buffalo was constructing a sewer and changing its outlet from the Erie canal to the Niagara river at what is known as the Bird Island pier. In the resolution and petitions a strong protest was made against what was thought to be a further pollution of the Niagara river and the aid of the Governor and of the State Commissioner of Health was asked to prevent such further pollution and the consequent increased contamination of the water supply of the cities of Tonawanda, North Tonawanda, Niagara Falls and Lockport, and the villages of LaSalle, Lewiston and Youngstown.

From an interview with Deputy Engineer Commissioner George H. Norton of the department of public works of the city of Buffalo and an inspection of the work of sewer construction underway at the Bird Island pier, it was determined that the work being carried out by the city consists in the lowering of about 400 feet of the Bird Island outlet sewer, the work starting at the mainland forming the easterly bank of the Erie canal and continuing under the canal and Black Rock harbor to the outlet of this sewer on the Niagara river side of the Bird Island pier.

This section of the Bird Island outlet sewer is being lowered about twelve feet under requirement of the United States Government in order to allow, following the necessary dredging, for a channel twenty-three feet in depth as provided for in the project for the new ship canal to be constructed by the Government.

The Bird Island outlet sewer was constructed by the city of Buffalo about 1883 and has been in continual operation discharging into the Niagara river since that time until the present reconstruction was commenced in December, 1909. No change in the outlet end of the sewer is to be made and the sewer when reconstructed will operate as an inverted siphon. When the present work was started, it was necessary to temporarily divert the flow of sewage

into the Erie canal at the east bank and this discharge of sewage into the canal will continue until some time in December when it is expected that the reconstructed sewer will be finished and put into operation and the sewage will then be discharged, as formerly, into the Niagara river.

This sewer is a circular brick sewer, eight feet six inches in diameter and the invert of the sewer as reconstructed will be approximately thirty-seven feet below the surface of water in Black Rock harbor. The sewer serves as an outlet trunk sewer for the southerly half of the city sewer system and carries sewage from about one-half the population of the city. All the city sewers south of Albany street, except such as discharge into Buffalo creek, are tributary to the outlet sewer described above.

It is evident from the foregoing that the reconstruction of the Bird Island pier outlet sewer now being carried on by the city of Buffalo involves no increased discharge of sewage into the Niagara river over that occurring at the time the work of reconstruction was started, nor does such construction change the location of the mouth of the sewer as it has existed since about 1883.

Respectfully submitted,

H. B. CLEVELAND,

Principal Assistant Engineer

ALBANY, N. Y., *October* 25, 1910.

GEORGE L. BECKRICH, *City Clerk, North Tonawanda, N. Y.:*

DEAR SIR: — In reference to the reconstruction of the Bird Island pier outlet sewer in the city of Buffalo referred to in the copy of the resolution adopted by the common council of North Tonawanda on October 4th, submitted to Governor Horace White and by him referred to this Department for attention, I beg to state that I have recently caused an inspection to be made of the work being carried on by the city of Buffalo and am enclosing herewith a copy of the report of such inspection.

You will note from this report that the work being prosecuted by the city of Buffalo will not result in any increased discharge of sewage into the Niagara river over that taking place when the work was started nor will such work change the character or location of the outlet into the Niagara river.

In fact this sewer was constructed so as to discharge into the Niagara river some twenty years before the passage of the act of May 7, 1903, which act requires that additional discharge of sewage may be created subsequent to the date of enactment only on the granting of permission for such discharge by this Department.

As you are aware, I have urged the Legislature for the past two years to amend the Public Health Law by granting to this Department, subject to the concurrence of the Governor and the Attorney-General, the right to require the removal of pollution from the streams of the State in cases where investigation by this Department should show the need for such action.

As respecting the pollution of the Niagara river by the discharge of sewage from Buffalo, Tonawanda, North Tonawanda, Niagara Falls, and other places, I beg to state that I am thoroughly in sympathy with the general movement that has been started to eliminate such pollution, as far as possible, and beg to assure you of the co-operation of this Department to that end. The problem, however, is a very important one and should be worked out in a comprehensive manner involving, as it does, practically all the municipalities along the river.

Assuring you of my interest in this question and of the continued efforts of this Department to protect the streams of the State from pollution, under such powers as are granted by the Public Health Law, I am,

Very respectfully

EUGENE H. PORTER,

Commissioner of Health

A communication similar to the foregoing was also addressed to Mr. George F. Nye, Secretary, Board of Health of Niagara Falls.

INSPECTION OF RENDERING PLANTS

INSPECTION OF RENDERING PLANTS

BARREN ISLAND

NEW YORK, N. Y., *December* 31, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: —

The Sanitary Utilization Company.— During the year 1910, this company received and disposed of 381,350 tons of garbage from Greater New York, this being taken care of in their Brooklyn and New York buildings. On July 10th they had a slight accident in the New York building, not stopping any of the active work of the plant, as it happened while the work of relining the digestors was going on in the New York building.

During the year they have put in an additional naphtha plant system with the Peck percolator and are now using the naphtha process entirely in connection with the grease.

They have put in some concealed presses by which they propose to do away completely with the open process system and they are rapidly perfecting this.

The chimney erected two years ago now eliminates all complaints against the plant and makes it more sanitary.

On the whole, this plant with all its new improvements is being kept up to a very high standard.

White Brothers.— This company has been running its plant steadily, taking care of the offals from Manhattan and Richmond boroughs up to July 10th. After July 10th they started up the former McKeever plant, now known as the Product Company, taking all the offals to this plant from all the boroughs in Greater New York.

The approximate number of carcasses removed to the plant are:

Manhattan	
Horses	10,414
Colts	27
Ponies	10
Cows	77
Dogs from public pound	100,044
Cats and dogs from streets	223,162
Bronx	
Horses	1,785
Colts	5
Cows	7
Cats and dogs	11,623
Richmond	
Horses	562
Cows	20
Cats and dogs	8,142
Brooklyn	
Horses	6,946
Cats and dogs	93,918

Queens

Horses	1,968
Cows	46
Cats and dogs	810

The original plant is still being used and receives between 50 and 60 tons of hotel garbage per day from New York and also reserves a number of digestors in this plant in case of mishap at the new plant.

They have been keeping their plant up to sanitary requirements, using the necessary disinfectants, keeping the building perfectly clean and I have had no complaints whatever.

Product Company.— This company has been in operation, as stated above, since July 10, 1910. Up to the 5th of October they were running two fishing boats in connection with the offal disposal along the coasts, gathering fish, which is all brought to their plant and boiled for the oil and the waste for fertilizing purposes. This plant was greatly improved with a new concrete boiler house and the rest of the improvements help to make the plant sanitary and healthful and I see no reason why in early spring it shall not meet with all the requirements of this department. They have been shipping filler south and very little remains any length of time in the plant itself.

Matrin White Company.— This company is running the old Coe plant. They are using the filler received from the Sanitary and White Brothers and average about 100 tons of fertilizer per day. The plant is in excellent condition. They are using a water spray for their acid mixing plant so as to keep the fumes from rising. As fast as the products are made they are shipped so that they only have about 500 tons of filler in storage at their plant at any one time. I have kept a very close watch on these plants and have taken note of the various improvements which have been only for the benefit of the public and they are all more than anxious to comply with all requests that are made.

Respectfully submitted,

B. F. HAMILTON,

Inspector

CHEEKTOWAGA

BUFFALO, N. Y., *December* 31, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— The American Agricultural Chemical Company (Milsom works) have expended in the past year for repairing and improvements the sum of $1,300. The improvements consist of installing three entirely new rendering tanks.

They have now under construction a radial brick stack to be 150 feet high and as soon as the weather will permit, they will construct two scrub towers on the east side of their rendering plant opposite the dryer room for the purpose of condensing all the gases from the dryers. The overflow from the condensers will go to the bottom of the new stack.

When these improvements are completed, there is no doubt but that they will be in the best shape possible and will be able to handle all the rendering material in a very sanitary as well as satisfactory manner.

In the past year they have handled approximately 7,000,000 pounds of rendering material as follows:

1,672,000 lbs. of tallow and bones from butcher shops and slaughter houses of the city.
250,000 lbs. of rack bones.
22,000 lbs. of rendered tallow.
9,000 lbs. of grease.
200,000 lbs. of rough tallow.

50,000 lbs. of meat.
600,000 lbs. of green bone.
196,999 lbs. of dead hogs.
72,000 lbs. of calves.
200,000 lbs. of fish.
800,000 lbs. of beef heads and feet.
1,150 head of horses.
40 head of cattle.

In October one of the dryers in their plant burned out causing an awful stench and it had to be replaced by an entirely new one.

Their plant in general is in first class shape and they are always willing to do anything they can to improve it so as to keep within the requirements of the rules and regulations of the State Department of Health.

The Buffalo Fertilizer Company, have received and rendered during the past year the following in their rendering plant:

	Head.
Hogs	3,283
Sheep	2,481
Calves	553
Cattle	171
Horses	1,039
Dogs	5,920
Cats	4,690
Total	18,137

In their garbage plant they have received and rendered approximately 109,748,000 pounds of green garbage.

Their wagons for hauling the garbage are kept clean and in good order, they are all built of iron and are unloaded and the garbage disposed of immediately upon arriving at the plant.

They have spent several thousand dollars on their buildings in their fertilizer plant and intend in the near future to put up a new rendering building.

The rendering building is old and they are very much in need of a new one; they have done considerable fixing on the old one and kept it pretty thoroughly whitewashed and use disinfectants quite freely but do not wish to spend any more money on it than possible as they want to put up a new place.

The low ground around the factory has all been filled up with cinders and is very much more sanitary than formerly.

The machinery and dryers are all in good shape and working order.

The several complaints I have received against these works seem to have been partly satisfied since they built twenty feet on their brick stack, but I think it would be better if they put on twenty feet more so that it would carry any obnoxious odors higher in the air.

Have received no complaints against these works for some time and from appearances, I anticipate no serious trouble from them in the future, but if there is, will take immediate steps to have it remedied.

All in all, I think the works have done quite well the past year as far as not causing any more trouble than really necessary and feel confident, that when the new rendering plant at the Buffalo Fertilizer is built and the chimney on the fertilizer plant carried up a little higher, there will be very little reason for complaint.

Can assure you, that when at any time there has been any complaint I immediately gave it my personal attention and got it straightened out satisfactorily to all concerned and now feel that everything out there is running along in a smooth and satisfactory manner.

Yours obediently,

JOHN T. CLARIS,
Inspector

ROCHESTER

ROCHESTER, N. Y., *December* 31, 1910.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— The work of inspecting the works has progressed as in previous years. Under the supervision of Mr. Haag there has been a marked and evident intention to make conditions sanitary. Visits have been paid as in the past at such times as was deemed best, without any notification to the management. These visits have averaged twice a week.

The areaway between the two buildings of the company has formed a low spot where drainage has accumulated, making it unsightly and unpleasant. Up to the present time, it was impossible to change this condition, owing to the fact that a tunnel connecting the two buildings, and a proposed conduit to be erected would make any improvement only temporary.

Mr. Haag informs me that during the coming season, this entire areaway will be drained and covered with some non-absorbing pavement, which will render it entirely satisfactory.

The fly problem was with us last year, and up to the present time no satisfactory solution has been found. Immense quantities of flies follow the wagons from the city to the works, and of course quickly find a home in the building. Mr. Haag has shown an evident desire to obviate this condition, and I think without question some solution will be found before the warm weather begins.

The buildings have lately been whitewashed and it is recommended that this be followed out at least quarterly during the year.

No formal complaints have been received against the works, and relatively few informal ones.

In my opinion inspection has been very beneficial to this plant, as it is now under this management and inspection, being conducted in a much improved manner over the past. Every suggestion is received with courtesy, and there is entire harmony and co-operation between the management and inspector. Several visits during the year by representatives of the Department have been very beneficial, as they have enabled some one who is competent and who approaches from a new view point to give very valuable suggestions. The last visit of Secretary Seymour was particularly helpful.

I append a report of the work of the company for the preceding year.

MONTGOMERY E. LEARY,
Inspector

Report of Rochester Tallow Company

Factory No. 1

This factory is given to the rendering of inedible tallow and tankage from fat and bones purchased from the different meat markets and slaughter houses of the city.

The following is the production:

Rendered tallow	1,350,000 lbs.
Tankage	600,000 lbs.
Dried blood	50,000 lbs.
Hoofs	20,000 lbs.
Horns	2,000 lbs.

Purchases:

Slaughter house fat	1,500,000 lbs.
Market fat	800,000 lbs.
Bones	125,000 lbs.
Suet	75,000 lbs.
Scraps, etc.	50,000 lbs.

Factory No. 2

This factory is given to the slaughtering of cattle, etc. (belonging to wholesale butchers) and the cleaning of casings.

Killed during the year:

Cattle	9,080
Calves	3,940
Lambs	4,820

SPECIAL INVESTIGATIONS

INVESTIGATION OF SANITARY CONDITIONS OF CITIES AND VILLAGES

These investigations and studies of the sanitary conditions of certain cities and villages in the State were begun some three years ago with the object, primarily, of determining what municipalities were apparently experiencing or suffering an unduly high rate of mortality from communicable diseases and, secondarily, of determining the causes and influences responsible for these high rates in order that they may be removed and the mortality rates lowered. These investigations have covered a considerable number of the cities and villages of the State, have proved of inestimable value to the respective localities, and have in most cases resulted in the undertaking of extensive improvements which will unquestionably lead to a lessening of death rates from infectious diseases in these places.

Since these investigations have in previous years covered the more important places where improvement seemed potential, leaving thus a smaller number of places for consideration, and owing to the necessity for important lines of investigation in other directions, there were investigated during 1910 the sanitary conditions of only three municipalities, namely Lockport, Kingston and Oneonta. These investigations were started late in the year and although only the field inspections and studies have been made at the close of the year it is expected that the reports will be completed at an early date.

INVESTIGATION OF ILLEGAL SEWER CONSTRUCTION

The handicap placed upon an effective campaign against illegal practices in sewer construction and the discharge of sewage into the waters of the State resulting from a lack of adequate powers granted the Commissioner of Health for the enforcement of certain sections of the Public Health Law, and of the failure of the passage of bills amending this law, has however not lessened the efforts of the Department in this direction. This campaign, if such it may be called, has been carried on along two general lines; first a special investigation to determine as to what municipalities were constructing sewers without the approval of the Department or were violating any of the conditions of any permit issued for discharge of sewage into streams; and secondly, the holding of conferences with local authorities when violations of the law occurred to enlist their co-operation and compliance with the provisions of these statutes.

Unfortunately there are many cities and villages still openly violating the Public Health Law in regard to both the construction of sewers and the discharge of sewage from them into the waters of the State. The large number of these cases and the serious conditions of pollution of some of our streams incident to them, makes the matter an important one, so much so that it was referred to the Attorney-General a year ago for his opinion as to the scope and powers of the Health Commissioner under Article V of the Public Health Law with reference to sewerage and sewage discharge, and to his authority in dealing with municipalities which persisted in violating the law.

This decision had not been rendered at the time my last report was transmitted but was received early in 1910. The decision is a very important one and disappointing in so far as it defines clearly the narrow limitation of authority and powers and of the Health Commissioner in enforcement of the provisions of Article

V and the relatively greater authority and power of local boards of health in correcting and removing violations of these provisions. Incidentally, it emphasized the pressing need for a complete revision of these sections of the Public Health Law.

As stated above, however, the efforts of the Department have not been relaxed in this direction, nor will they be, notwithstanding the present number of continued violations of the law and the greater difficulties resulting from the recent decision of the Attorney-General. It should be stated, however, and with no little credit to the people and local authorities in the State, that throughout our work in this direction there has been generally shown a spirit of co-operation in this movement to correct abuses of stream pollution and to comply with the provisions of the Public Health Law.

SANITARY INSPECTION OF SUMMER RESORTS

The work of inspecting the sanitary condition of summer resorts, first commenced by this Department in 1906, has been extended each year since that time. During the season of 1910 three inspectors were engaged almost continuously on this work for a period of three months.

The work accomplished in 1910 includes the reinspection of 259 resorts previously inspected, to the proprietors of which resorts letters had been addressed requesting that improvements in sanitary arrangements at their resorts be made, together with original inspections of some 170 additional resorts not previously inspected, a total of 429 resorts, many of them accommodating several hundred guests, having been visited and inspected by representatives of the Department during the year.

As noted in my report of last year, the State has been divided into thirteen districts in order to systematize the investigation and to facilitate the work of inspection. These districts are as follows:

1. Thousand Islands — St. Lawrence district.
2. Fulton Chain — Big Moose district.
3. Raquette, Tupper and Long Lake district.
4. Saranac — St. Regis district.
5. Lake Champlain district.
6. Lake George district.
7. Lake Pleasant — Saratoga Springs district.
8. Western district.
9. Central — Finger lakes district.
10. Otsego Lake — Richfield Springs district.
11. Catskill — Albany district.
12. Southern district.
13. Long Island district.

Reference is made to the accompanying map which shows the summer resort districts as noted above.

A full description of the various districts and of the scope and purpose of this investigation is contained in the 30th annual report of the Department for 1909, and for this reason the work accomplished in the several districts during 1910 will be but briefly described although it was possible to extend the investigation much further during 1910 than in previous seasons.

THOUSAND ISLANDS — ST. LAWRENCE DISTRICT (No. 1)

This district comprises Jefferson county and the greater portion of St. Lawrence county. Of the 37 resorts inspected, 25 were located along the shores and on the islands of the St. Lawrence river. At thirty-five resorts insanitary conditions were found, consisting principally of the use of a source of water supply subject to pollution or the discharge into streams and lakes of untreated sewage.

FULTON CHAIN — BIG MOOSE DISTRICT (No. 2)

This district includes all or portions of the counties of Lewis, Herkimer, Hamilton and Oneida. Thirty-nine resorts of the 60 originally inspected in 1909 were reinspected in 1910 and it was found that at seven of these resorts the insanitary conditions criticized had been removed, while at many others arrangements had been made or work was being done to place the resorts in proper sanitary condition.

RAQUETTE — TUPPER — LONG LAKES DISTRICT (No. 3)

Reinspection was made at two of the five resorts inspected in 1909 and it was found that at both these resorts the insanitary conditions criticized had been corrected.

Three additional resorts were inspected in 1910 in this district, completing the work in this section, and at each of these resorts insanitary conditions were found.

SARANAC — ST. REGIS DISTRICT (No. 4)

This district includes all or portions of Franklin, Clinton and Essex counties. Of the twenty resorts inspected in 1909 insanitary conditions were found at nine and on a reinspection of these nine resorts in 1910 it was found that at four resorts the insanitary conditions criticized had been corrected.

Eight additional resorts were inspected in this district in 1910, completing the work in the district, and it was found that at six of these resorts there were insanitary conditions to be brought to the attention of the proprietors.

LAKE CHAMPLAIN DISTRICT (No. 5)

This district includes those portions of Clinton and Essex counties adjacent to Lake Champlain. The summer resorts in this district were inspected during 1910 and, among the fifteen resorts inspected, insanitary conditions were found at ten resorts consisting principally of the partial use of a water supply subject to pollution and the discharge of untreated sewage into lakes and streams.

CENTRAL — FINGER LAKES DISTRICT (No. 9)

Of the ninety-two summer resorts in this district inspected in 1909, sixty-six required reinspection in 1910 and at twenty-eight of these it was found that the insanitary conditions had been corrected, necessitating further action, therefore, in the case of thirty-eight resorts.

CATSKILL — ALBANY DISTRICT (No. 11)

At 132 of the 191 resorts inspected in this district in 1909, reinspections were made in 1910 and it was found that insanitary conditions still existed at 94 resorts necessitating further action by the Department.

In 1910, also, 103 additional resorts were inspected in this district and insanitary conditions were found at 75 of these resorts. The inspection of resorts is not yet completed in this district, although a considerable portion of the territory has been covered.

SOUTHERN DISTRICT (No. 12)

Eleven resorts were reinspected in this district in 1910 and insanitary conditions were found uncorrected at eight resorts.

Two additional resorts were also inspected in this district, and conditions were found at each necessitating further action by the Department.

PROGRESS OF THE INVESTIGATION

As a result of the work of summer resort inspection carried on in 1910 and in previous years, the Department now has full information concerning the sanitary condition of practically all the summer resorts accomodating twenty-five or more guests in the above described districts with the exception of districts 11 and 12.

In the case of many resorts scheduled for second notification and for reinspection, partial improvements were found to have been made and it is believed from past experience that all the improvements recommended will be found on a second reinspection to have been completed at many of these resorts.

As has been the custom in the past, it is intended that publicity shall be given in the Department's Monthly Bulletin or the press to those resorts where the proprietors, after repeated notices from this Department, have failed to make the improvements recommended to safeguard the health of their guests.

In this connection it may be stated that many requests are received during the summer season from prospective summer visitors, for information relative to the sanitary condition at hotels and summer resorts which they are planning to visit. From the records of recent inspection of summer resorts on file in the Department, it has been possible to answer many of these inquiries and it is expected that eventually complete records will be available at this Department of the sanitary condition of all summer resorts in the State.

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INVESTIGATION OF SANITARY CONDITIONS OF STATE INSTITUTIONS

At the last session of the Legislature, section 14 of the Public Health Law was amended by chapter 92 of the Laws of 1910, to provide for examinations and reports on the sanitary condition of such institutions as report to the Fiscal Supervisor of State Charities whenever requested by him, and for regular analyses of water supplies of these institutions. A request was accordingly received from the Fiscal Supervisor on May 18, 1910, for examinations and reports of all of these institutions, and since that date the work of inspection has been in progress jointly by the Divisions of Engineering and Laboratory. There are seventeen of these State institutions, as follows:

Western House of Refuge for Women, Albion.
New York State School for the Blind, Batavia.
New York State Soldiers and Sailors' Home, Bath.
New York State Reformatory for Women, Bedford.
New York State Reformatory, Elmira.
New York State Training School for Girls, Hudson.
Agricultural and Industrial School, Industry.
Thomas Indian School, Iroquois.
Eastern New York Reformatory, Napanoch.
New York State Custodial Asylum for Feeble-Minded Women, Newark.
New York State Woman's Relief Corps Home, Oxford.
New York House of Refuge, Randall's Island.
New York State Hospital for the Treatment of Incipient Pulmonary Tuberculosis, Ray Brook.
Rome State Custodial Asylum, Rome.
Craig Colony for Epileptics, Sonyea.
Syracuse State Institution for Feeble-Minded Children, Syracuse.

New York State Hospital for the Care of Crippled and Deformed Children, West Haverstraw.

Although no provisions for increased funds were made to cover the work thus added to the regular duties of these two divisions, this work has been actively prosecuted and at the close of the year the examinations and inspections of all of the institutions listed above have been made and the reports when completed are being transmitted to the State Fiscal Supervisor and to the Board of Managers of these institutions.

The report on the examination made at the New York State Hospital for the Care of Crippled and Deformed Children, at West Haverstraw, follows:

ALBANY, N. Y., *December* 30, 1910.

Hon. DENNIS MCCARTHY, *Fiscal Supervisor of State Charities, Albany, N. Y.*:

DEAR SIR: — In accordance with your request and under the provisions of chapter 92 of the Laws of 1910 I beg to submit the following report of an examination and inspection of the sanitary conditions of the New York State Hospital for the Care of Crippled and Deformed Children at West Haverstraw.

This examination and report represents one of a series which will ultimately include all of the State institutions which now report to the Fiscal Supervisor of State Charities. The inspection, or field work, was made jointly by the heads or representatives of the Engineering and Laboratory Divisions who visited the institution and made an examination and inspection of such features, conditions and methods of management as might have a bearing either directly or indirectly upon the sanitation, health and general welfare of the inmates and attendants.

In order to facilitate the inspection and to simplify the collection of data and the reporting of results, the work has been taken up under the following headings or topics, viz.: (1) Location and general description, (2) engineering, (3) communicable diseases, (4) organization and administration, and (5) vital statistics. Owing to individual differences respecting local conditions or administration at the various institutions investigated, it was not always found necessary to make examinations under all these divisions; nor was it always found desirable to take up the work or report the results in the order given. Wherever it was considered necessary, however, the examination, as well as the report, was made complete and generally in accordance with this classification.

LOCATION AND GENERAL DESCRIPTION

The institution is located about one mile west of the Hudson river and about half a mile northwest of the West Haverstraw station of the West Shore Railroad. Some criticism has been expressed as to the wisdom of the choice of this particular site and it was on account of this criticism that the bill appropriating $100,000 for new buildings which passed both houses of the Legislature in 1908-9, was vetoed by the Governor. The State Board of Charities, however, has carefully considered the objections which have been made to the site and does not believe them justifiable and as a result of their findings unqualifiedly approves the request for the appropriation for the extension to the buildings as at present located. It is estimated that in New York State there are not far from 6,000 crippled children who ought to be cared for in a hospital of this sort and it is manifest that one old wooden house with a capacity of forty-five children is totally inadequate. The present

building is on the crest of a hill rising 140 feet above the river and the other buildings of the institution are on the plateau to the rear of the main building. Behind the barn is a natural depression which in the past has been objected to because of the swampy nature of the soil and the accumulation of stagnant water in the spring and after rains. This natural basin has had no outlet and since the property of the institution is surrounded on all sides by other holdings, no simple method of drainage is evident. The managers have undertaken to fill up the depression which has already advanced so that the swampy appearance and vegetation have disappeared. There seems to be no evidence or reason for supposing the location to be unhealthful or of a character predisposing to disease of any sort.

The institution is a single large house, not originally intended for hospital services, of old construction and quite poorly adapted for its present use. The walls are old plaster; the floors of wood, old and somewhat irregular with large cracks in many places, a kind of construction and room not suitable for hospital service where any real cleanliness is requisite.

The cellars of this building are utilized for the heating plant, for the kitchen, for the vegetable storage, for the laundry and coal storage.

The quarters are cramped and quite poorly lighted. The kitchen is very poorly equipped. The furniture and floors are of a nature practically impossible to be kept with the cleanliness which is attained in more modern and suitable buildings for purposes of this nature. Above the kitchen on the first floor are the two dining rooms, one for the inmates and one for the employees. The dining room is far too small, so that the inmates are unduly cramped for suitable care and attention for inmates of this nature while at their repast.

On this floor is also the entrance office and ward rooms for inmates.

On the floor above are also ward rooms and the rest of the building is occupied by rooms utilized by the resident staff and employees. There exists no laboratory or any equipment therefor.

WATER SUPPLY

The water supply of the institution is taken from the municipal supply furnished by the Haverstraw Water Company, which comes partly from small streams and partly from wells at Thiells. The watershed of the streams is now protected by rules of the State Department of Health. The analyses of the Department show that this water supply is generally of a good quality, free from organic matter and satisfactory for drinking purposes. The water is supplied through a meter and it is said that the quantity and pressure are satisfactory. The quantity used amounts to 45,000 gallons per month or 1,500 gallons a day, not quite thirty gallons per head. The following analysis has been made by the State Hygienic Laboratory of a sample of tap water taken in the dining room at the time of the writer's visit.

Free Ammonia	Albuminoid Ammonia	Nitrogen as		Chlorine	Oxygen Consumed	Bacteria per c. c.	B. Coli.		
		Nitrites	Nitrates				10 c.c.	1 c.c.	1/10 c.c.
.002	.042	.001	0.16	2.75	0.67	600	plus	plus	plus

This does not show as good quality as usual, the bacterial count being high and colon type being present in samples as small as 1/10 c.c. It is probable, however, that, since the streams receive surface wash, the large number of bacteria are accounted for in this way. The analyses on some other occasions have shown this same feature. It follows, therefore, that while the water may be considered as an average type of surface water, its quality is doubtful and suspicious and in spite of the record of good health at the institution, the water is a possible cause of sickness under unfavorable conditions of contamination.

PLUMBING

The plumbing of the institution is all new, having been installed under the supervision of the State Architect, within the past seven years. No criticism can be offered in this regard and no suggestions for improvement can be made.

SEWERAGE AND SEWAGE DISPOSAL

The sewage of the institution is cared for through a six-inch pipe which leads from the front of the main building directly to the Hudson river under the tracks of the West Shore Railroad. On December 6th, 1905, a provisional permit was issued to the board of managers of this institution for the discharge of sewage directly into the Hudson river upon condition that a sewage disposal plant be constructed on or before November 1st, 1906, and Mr. O. H. Landreth of Schenectady, under date of January 26, 1906, estimated the cost of a proper system of disposal just below the West Shore Railroad, making use of a septic tank and continuous percolating filters, at $2,000. This disposal plant was never built and the sewage at present discharges directly into the Hudson river. Although this is not a reflection on the sanitary condition of the institution itself since the main sewer is apparently well laid and a flush tank at the upper end of the line secures a thorough cleansing of the sewer weekly, it is nevertheless not in accord with the provisions of the Public Health Law and the conditions of the permit referred to; and steps should therefore be taken at once to construct this disposal plant or to provide some satisfactory substitute method of disposal to be approved by this Department.

GARBAGE DISPOSAL

The kitchen garbage of the institution is gathered in a pail and hauled to a pig pen at the back of the property where from four to six pigs are kept for the purpose of consuming it. The pig pen is clean and in good order and without nuisance.

HEATING AND VENTILATION

The building is heated by an effective steam furnace in the basement, the direct system of radiation being used. In view of the fact that a large proportion of the cases committed to this institution are tuberculous in character, the question of ventilation is not a vital one since the physician in charge sees to it that practically at all times the wards and rooms are freely opened to the outdoor air. It is intended that even in the coldest weather a temperature of only sixty degrees is to be maintained in the building and it was learned that in all but the most severe weather the outdoor pavilions are used throughout the day.

FIRE PROTECTION

There are standpipes in each corner of the building with hose attached for fire protection. There are, however, no hydrants on the outside of the building. An outside metal fire escape has been provided on the north side of the building which affords opportunity for egress from the wards on that side of the building.

ICE

Ice for the institution comes from the Carner Print Works pond, a small pond west of the institution on the Minisceongo creek. This stream comes from the hills back of the institution and is apparently free from pollution. The Eastern New York Custodial Asylum at Thiells gets its water from this same creek and examinations of its quality have been made in view of this use of the water.

HOSPITAL SPACE AND EQUIPMENT.

It was stated at the time of this inspection that forty-five patients were at the institution, but that the number lodged and fed in the institution — patients and employees — was actually seventy-two.

The wards are made up of former rooms of this building, where a number of intervening partitions have been taken out to make large rooms. The

floors of wood are old and quite unsuitable for being kept in proper clean condition that modern hospital service requires.

The wards in general appear cramped and the general impression of examining this institution is that all of the quarters are cramped.

The medical offices are far too small to be at all suited for the work of this kind. The wards are so small that the beds appear brought far too near together. The ceilings are not high, so that the proper ventilation would require most careful attention and constant use of wide open windows, in view of the crowded population of these wards.

There is practically no suitable dispensary quarter. The bath rooms, while perhaps sufficient for absolute requirement of bathing, do not appear sufficiently sanitary for the use of these inmates.

The medicines utilized in the establishment are kept in two places, i. e., in a large wooden cupboard, standing in one of the rooms used for a medical ward (actually dismantled and in process of repair at the time of inspection), and also some medicines in a small closet in the room on the first floor used as a medical office.

Most of the medicines are in the original packages with which such articles are bought from dealers. Many bottles, for instance, containing liquids, have cork stoppers, which are more or less mutilated upon being removed at the first opening of the packages, and are quite unsuitable for permanent keeping of medical supplies of this nature which are frequently used.

It was not apparent that any particular care to keep poisons under the sole control of the medical officer was utilized.

The operating room on the second floor, also a former room of the house, has wooden floor of more or less loose construction, and the operating room in general is quite unsuited for an operating room, in which operations which would require asepsis could be safely undertaken.

The furnishing of the operating room was meager. A large and expensive sterilizing outfit was there, but entirely out of order. The instruments for surgical operations were in good order, and in numbers would scarcely seem to be sufficient to care for special operations that might be expected in the class of patients that exists in this hospital. It was answered on inquiry that relatively very few operations were performed there and, in fact, it would seem that the surgical services of such a hospital under such conditions would be most successful when employed at its minimum.

In addition to the ward accommodations above referred to there was found in the rear of the stable a building of rough wooden walls and rough floor, practically a stable building of the most primitive kind, and in this large room there were quartered permanently a large number of the inmates.

Ranged in rows through this room were large wooden tables of rough boards, and on these unpainted rough boards with no springs and no immediate cover of any kind were laid the mattresses in close proximity, and on these mattresses the inmates quartered in this room slept.

There could be no question of ventilation in this very crowded structure. There was no plumbing in the building, no toilet. The children were obliged to use for toilet purposes pails which stood in the corner.

There seems to be no special provision for disinfecting these pails, and the general condition of the floor, corners of the rooms and the surroundings of these pails would indicate very little more cleanliness than is usually maintained in an old carriage house.

There was no provision for privacy during any of the operations of toilet which might be necessary for these inmates, and it was stated that these inmates did not seem to feel the need of any such privacy.

There seemed to be no systematic or frequent cleansing of the floor, walls or tables utilized for beds in this room. It was stated that the wash of bedding was issued clean once a week. It was not apparent that there was any routine method of airing or cleansing mattresses or blankets here utilized.

There was also on the grounds of the institution a further building of rough board structure, with open sides, of a plan well known for the open-air treatment of tubercular patients. This building was also occupied by inmates quartered there, also sleeping upon mattresses laid upon rough board

tables, duplicates of those before described in the preceding building, and there was the same lack of provision of toilet, and the consequent recourse to the use of the slop pail for all of these necessities that were noted for the preceding building.

Also, by reason of one or more sides always open, through which any passerby can see the inmates, it was evident to our inspector that there was no provision whatever for privacy during any toilet operation of the inmates in that building.

FOODS

The food supplies for the hospital are locally purchased by the steward after estimates have been submitted to and approved by the State Fiscal Supervisor, and the quality, weights and prices are subject to rigid rules and inspections of the State Fiscal Supervisor. These supplies appeared to be of good quality and were kept and stored under sanitary conditions.

The milk is supplied by a local farmer under a satisfactory agreement as to price and delivery, and according to the analyses of the State Department of Agriculture the milk is shown to be of good quality.

Under an amendment to the Agricultural Law semi-annual analyses of all food supplies of the hospital are provided for, and in the case of milk supply a monthly analysis. These analyses should afford an efficient check upon the quality of the foods purchased and should aid materially in the careful supervision of them.

LAUNDRY

The laundry of the institution was exceedingly primitive, in the cellar of the old house, where all of the work was done by hand by paid employees. The room is certainly poorly ventilated and poorly lighted. It cannot be healthy for the people and is quite unsuited for the use to which it is put.

EXERCISE AND RECREATION

There are apparently no large recreation rooms or hall for systematic exercise of the inmates and no general meeting room suitable for assembly exercises.

QUARANTINE

In addition to the main building there is a small building specially designed and constructed for isolation and quarantine hospital services. It is a small detached wooden building with three rooms and kitchen, apparently well isolated, one room from another, and with outdoor entrances to each room, permitting accessibility to the kitchen also, so that a very satisfactory isolation and quarantine service could be maintained in this building. It is intended for use of contagious disease.

There were no such cases in the building at the time of inspection, but apparently any one or more of the rooms could be rapidly equipped and immediately utilized for such purposes when needed.

At the time of the inspection one of these rooms was occupied by one of the nurses of the establishment, it being stated that it was necessary to have the nurse living permanently in this room by reason of the crowded condition of the main building not permitting her location with the rest of the employees.

It was not apparent that there existed any system of thorough inspection of any of the inmates on their first arrival, or that any special effort or care was taken to insure the complete absence of any contagious disease in a new arrival.

CONCLUSIONS AND RECOMMENDATIONS

1. That although the water supply of the institution now furnished by the Haverstraw Water Company is generally of satisfactory quality and is now protected by rules and regulations enacted by this Department, which if enforced by the water company would make the water more uniformly satisfactory, it is shown by analyses to be at times of unsafe quality; and unless the supply is improved and made of uniformly safer quality the question of securing a new and independent supply of unquestioned purity should be seriously considered.

2. That a sewage disposal plant be constructed according to the plans approved by this Department in 1906, or according to new plans to be at once prepared and approved by this Department, in accordance with the conditions of the permit issued by the Department in connection with the approval of plans requiring the construction of this plant.

3. That, owing to the overcrowded condition of the institution, including dormitory, dining room and hospital accommodations, additional space should be provided either by suitable extensions to existng buildings or new buildings; and that such extensions, alterations or repairs be designed and made with a view to supplying not only additional space, but also other omissions covering conveniences and equipment referred to more in detail in the following recommendations:

4. That the use of the quarters connected with the stable be discontinued for dormitory or ward purposes.

5. That such renovation and repairs be made throughout the institution as will permit the walls and floors to be maintained in a thoroughly clean and sanitary condition.

6. That all bedrooms be provided with suitable adjoining lavatories.

7. That suitable and sanitary bedsteads and ward furniture be furnished to replace existing ones.

8. That a suitable and modern operating room and adjunct room be provided and that surgical therapeutics be encouraged.

9. That suitable laundry quarters and equipment be provided as will permit laundry work to be carried on in a convenient and sanitary manner, with respect to both the health of the people working in the laundry and the character of the work turned out by them.

10. That a more systematic and complete system of medical inspection and quarantine be instituted to detect the existence of and provide a quarantine for any contagious diseases among inmates and employees; more particularly a thorough medical examination of inmates on their first arrival and of employees on their return from leave of absence.

11. That the quarantine quarters be not used for permanent quarters of employees of the institution.

Respectfully submitted,

EUGENE H. PORTER,

Commissioner of Health

SANITARY INSPECTION OF LABOR CAMPS

Among the special investigations carried on during the year by the Engineering Division should be mentioned the inspection of sanitary conditions at labor camps. While the resources of the Department and the force of engineering inspectors available did not permit a very extensive investigation along this line, it was thought best to have an inspector from the Department visit some of the largest construction camps maintained in connection with the three important lines of engineering construction being carried on in the State,— namely, the work of the New York Board of Water Supply, the Barge Canal and the State Highway Commission. The purpose of the investigation was to examine into the general sanitary conditions affecting the laborers engaged upon the work with special reference to the water supply, the housing and dormitory accommodations, provision for sanitary conveniences and the disposal of wastes and the food supply and to call to the attention of the contractors and of the local board of health any insanitary conditions found, notifying them to correct such insanitary conditions.

Following is a list of the labor camps inspected:

LOCATION.	Contractor.	Work engaged upon.	Laborers employed.
Brown Station, Ulster county.	MacArthur Bros. Co. and Winston & Co.	N. Y. Water Supply	3,000
Cartersville, Monroe county.	Butler Bros	Barge Canal	125
Carthage, Jefferson county	Patrick Murray	State highway	90
Cherry Valley, Otsego county.	Dorpian City Construction Co	State highway	35
Ebenezer, Erie county	F. W. Brotsch Co	State highway	77
Gasport, Niagara county	Empire Engineering Corporation	State highway	100
Valhalla, Westchester county.	J. C. Rogers Co	N. Y. Water Supply	650
Vischers Ferry, Saratoga county	Acme Engineering & Contracting Co	Barge Canal	200
West Brighton, Monroe county	Millard & Supton Co	Barge Canal	125
Yonkers, Westchester county.	Keystone State Construction Co	N. Y. Water Supply	800

The selection of the camps to be inspected was made by requesting from the officials having charge of the New York water supply extension, the Barge canal construction and the State highway work, the names of the contractors and the location of the six largest contracts under their charge. Through the courtesy of

these officials such lists were obtained and all labor camps maintained in connection with these contracts were visited and inspected. Some of the contracts included in these lists were found to have been completed and at other locations noted in the lists no labor camps were maintained so that other nearby camps or camps noted in supplementary lists were inspected.

In all some sixteen inspection trips were made and ten labor camps were inspected. At two camps the sleeping quarters were found to be inadequate. At three camps the water supply was found to lack proper protection from contamination. At four camps, a lack of sanitary conveniences was noted or privies were found to be in insanitary condition. At two camps the disposal of sewage and wastes was found to be imperfect. The insanitary conditions found were in all cases brought to the attention of the contractors and of the local board of health with the request that the camp be at once placed in proper sanitary condition.

ENGINEERING DIVISION EXHIBIT AT STATE FAIR

MODEL OF SEWAGE DISPOSAL PLANTS SHOWN AT EXHIBIT OF DEPARTMENT AT SYRACUSE STATE FAIR

ENGINEERING DIVISION EXHIBIT AT THE STATE FAIR

Perhaps nothing can better or more graphically illustrate the character and diversity of the work of the Engineering Division than the display of maps, records and models exhibited as part of the Department's general exhibit at the State Fair at Syracuse; and for this reason and because a considerable amount of work was devoted to the preparation and arrangement of these engineering records and models, mention should be made of it.

This exhibit was essentially an educational one and comprised largely a wall display of plans, charts, profiles, photographs and other graphical illustrations representing the work of the division in connection with public water supplies, sewerage and stream pollution; and a series of working models, in operation, representing various methods and types of sewage purification works. Interest centered largely around these working models, and in connection with the operation of them a member of the engineering staff was detailed to give brief descriptive talks upon their constructive and operating features.

It may be well to mention in connection with these models that they were made from actual detailed plans, requiring considerable time in their construction, and that so far as known they represent the first working models of sewage purification works that have been exhibited, at least in this country. A photographic reproduction of this model is shown herewith.

PROCEEDINGS OF THE CONFERENCE

OF

SANITARY OFFICERS OF THE STATE

CONTENTS

Proceedings of the Tenth Annual Conference of Sanitary Officers of the State of New York, Y.M.C.A. Auditorium, Buffalo, November 16-18, 1910

The conference was called to order by Francis E. Fronczak, M.D., commissioner of health of the city of Buffalo, Wednesday, November 16, 1910, at 11 A. M.

Address of Welcome by Dr. Francis E. Fronczak

Mr. Commissioner and Fellow Sanitary Officers — I consider it a great privilege indeed, on behalf of the city of Buffalo, to welcome you to our municipality. His honor the mayor, the Honorable Louis P. Fuhrmann, is unable to be with us here today, and he instructed me to bid you a most cordial welcome.

Buffalo, indeed, feels proud of being able to have you as its guests. We believe and we know that the sanitary officers of the State of New York have the best interests of humanity at heart. They strive and labor for the good of mankind. They endeavor through human life to increase the happiness of the people living within this State. It is a great ideal, and I wish to say that no higher ideal can spur anyone than your ideal of making humankind healthy and happy.

I am quite sure that the discussion and the papers which will be presented here in the next three days will be of great value to the community and the State at large, as well as the nation.

Again I repeat, on behalf of the city of Buffalo, and on behalf of the medical profession, I extend to you, ladies and gentlemen, a most hearty welcome, and wish you godspeed in your labors.

REPLY BY COMMISSIONER PORTER

FELLOW SOLDIERS — I am sure that, engaged as we all are in this battle for proper sanitation throughout our great State, we have been glad to listen to this kindly and most courteous welcome from the representative of the government of the great city of Buffalo. It is inspiring to have with us on this platform of our annual meeting a health officer so utterly imbued with the spirit of public duty and public sanitation that characterizes Dr. Fronczak, the health commissioner of the city of Buffalo, in his efforts in working toward that government which leads not only to the betterment of sanitary conditions, but an elevation of citizenship. It is an incentive to us in our conference to go ahead in those matters of highest concern to the State, and strive to make this meeting one of more than usual mutual benefit.

We have here meeting in Buffalo at the same time with us, a great organization, known as the National Municipal League. It is one of the signs of the day, I take it, that organizations of that kind are in existence. It is in very truth and in the last analysis a league for the promotion of health. It is a sanitary league; and yet while it will not have presented to it papers on the same subjects that we shall consider, yet so far reaching and interwoven are the threads of sanitary science, so far are they interwoven in the web and woof of our sanitary life, that I think the work of the National Municipal League will lead as inevitably to the end we all desire, as our own meeting will do. And we must not forget that behind these questions of sanitation, which are in themselves questions that involve constructive statemanship, there is always a moral issue. Were it not for that fact, the impression we are able to make on our fellow citizens; the sympathy we encounter, and the advances we make, would never be made. It is the moral side of this question — the right of it — that appeals to American citizenship; and it has a direct bearing upon the rights and the privileges and the freedom of the individual.

Now, in the last chapter, it means freedom from filth and foul air. It means freedom from infected air and water and epidemics, and makes for the freedom which gives health and higher citizenship.

I need not say, my friends, how glad I am to welcome you to our annual conference on behalf of the State Department of Health. I need hardly once more remind you that you are in very truth a department of health. Imagine for a moment — if you will give the romantic side of your intellect some play — imagine a State like ours with health officers thoroughly trained and efficient; with a competent and adequate salary; with an enlightened public, and with efficient and strong health laws to back the Health Commissioner up, imagine such a condition in the Empire State and its effect in every village and rural community throughout the State. The thought or conception that may come to us this morning is sufficient to tell us all that should such a condition of affairs be brought about, sanitation in every aspect would be accomplished in our State; and so it is our duty to labor to bring about that condition of affairs. And remember, that this purpose, like every other, has three stages or subdivisions: First, acquirement of the knowledge; second, dissemination of the knowledge among the people; and third, a strong and efficient health law. Those are the three things that must support the structure we are so anxious to build.

But, I must not interfere with this program. I think you will find it a most interesting program. It is a great pleasure for me to introduce the first speaker, one of our best medical officers in the Department, who will address you on the subject of "The Public School as an Aid to Public Health Work," Dr. John S. Wilson, our medical officer at Poughkeepsie.

THE PUBLIC SCHOOL AS AN AID TO PUBLIC HEALTH WORK

By JOHN S. WILSON, M.D.

Medical Officer State Department of Health, Poughkeepsie

As health officers we must be concerned not only with insanitary conditions that call for action to-day, but we must ever bear in mind that the future may be anticipated and safeguarded.

As we continue in public health work, our ideas tend to become more presbyopic. The time was when boards of health largely confined their efforts to the abating of nuisances and the quarantining of communicable diseases. Today we have a keener conception of our duties; we view the situation from a higher plane; that which formerly constituted our field of work now lies at our feet and we look beyond. We scan the distance and observe conditions that must be corrected to prepare the way for the ever forward march of progress.

It is from this higher viewpoint that we direct our operations to intercept disease. We prevent the pollution of streams, guard the water supplies, scrutinize the milk situation, erect suitable dwellings, distribute antitoxin, inspect schools, etc.

At this time we are concerned only with the problem of "The Public School as an Aid to Public Health Work."

The period of childhood has its own peculiar diseases and physical ailments; we may acquire an idea of the prevalence of these conditions when we consider that at least 50 per cent. of the school children are subjects for the attention of the school inspector.

When we reflect that their communicable diseases are preventable, and their physical defects are largely curable, no studied argument is required to convince us that a great field of preventive medicine is open, and the importance of the subject commands a deserving place in the attention of public health workers.

I stated that 50 per cent of the school population suffered from some defect; at first thought this figure may appear to be high, but inspectors have placed the figure at all points from 18 per

cent. to 100 per cent., depending upon the individual inspector's standard.

In the New York city schools 1,500 children were selected at random, and 85 per cent. and 95 per cent. of them needed treatment. These defects are frequently overlooked by parents who are either indifferent or ignorant or unobserving; but once detected by the inspector, a form noting the trouble is sent to those parents, with the recommendation that the child be referred to the family physician for his advice. In some instances, the little one is so referred, and the physician corrects the defect which has retarded the full physical and mental development, and impaired the work of the patient.

Following the note into the home comes one of our newer recruits in sanitary work — the school nurse. She needs but the excuse of the inspector's report to gain an entrance into the family, and oft-times into the heart of the mother. While explaining the nature of little Willie's trouble, her observing eye is taking in the situation, and the conditions under which Willie is being raised. The baby on the floor, with a piece of bread in one hand and a sick cat in the other, does not escape her observation, and calls for her advice. Then she notes and comments upon the uncovered milk pail, and inquires where the milk is obtained, and explains the necessity of keeping it cold and protected from the dust — explaining that the milk kept in the warm room for twenty-four hours will contain more germs than sewage (Chapin). Have any of the children ever suffered from milk poisoning? Milk poisoning was once called cholera infantum, or its symptoms were referred to "teething" or the "second summer." What does Willie eat before coming to school in the morning? The nurse then explains that the father's breakfast, adapted to a man performing hard manual labor in the open air, is unsuited for the child who spends the morning in school. She then remarks that late one night she saw the aforesaid Willie playing in the street when he should have been in bed; a boy of his age should have ten hours sleep if he wishes to grow up into robust, vigorous boyhood. Where do the children sleep? Why is not the window open to allow the sunlight and fresh air to enter? It is not a good plan to make the bedroom a storage place for vegetables, etc. Surely

the dogs are not allowed to sleep in the room with the children. Perhaps the mother herself does not appear well; timely advice, counsel and encouragement may help her along the weary journey. The amount of kindly advice the nurse may offer is limited only by her tact and her interest in the work. We will grant that often the advice is wasted, but some of it falls on good ground and will bring forth results.

This sort of work will claim a prominent place in the estimation of any one who has thoughtfully considered its possibilities. It will be along similar lines that our most efficient work will be conducted in the great tuberculosis campaign.

We may legislate, isolate, segregrate, fumigate, and variously amuse ourselves, but the efficient work that will be worth while will be accomplished by this heart-to-heart teaching.

Has it not occurred to you that when we place an advanced case of tuberculosis in a camp or hospital we tacitly admit that a preventable disease has passed our control? The time to have intercepted that person's disease possibly was back in his school days, when there was no visiting nurse to advise his mother concerning his diet, dress, sleep, and his beginning physical defects.

If tuberculosis is a preventable disease, why do we not prevent it? We are still consuming too much energy in trying to treat it? If we may credit the teaching of the adage—"An ounce of prevention is worth a pound of cure." I believe the earnest, painstaking teaching of the school nurse in the homes of the school children will outweigh some of our more showy efforts.

While this sort of work is being cared for in the home the inspector at school is finding more children with malnutrition, enlarged cervical glands, chorea, cardiac disease, pulmonary disease, skin disease, defective vision, defective hearing, defective nasal breathing, defective teeth, hypertrophied tonsils, post-nasal growths, etc.

If these conditions can be remedied during school life, the children become equipped with an increased ability to do better work later in life, and are less apt to become dependents.

It has now become an established fact, confirmed by the observation of all school inspectors that the children having the above mentioned conditions furnish a very large percentage of the tru-

ants, delinquents and defectives in school life. If the child is unable to hear well, or can not see the blackboard, or is always tired because of eye-strain, he loses interest in the class work, he lags in the race, and requires but little encouragement to absent himself from school. After a time he becomes a recognized truant; the end of this is, in the majority of cases, a useless, if not a criminal life.

Again, if such a defective is inclined to remain at school, he falls behind his class and fails to be promoted. I have visited the schools of Poughkeepsie with Dr. F. J. Mann, the school inspector, and have seen the diseases mentioned, and have witnessed the conditions I have attempted to describe. One needs no greater incentive to preventive public health work than to look into the upturned, earnest faces of forty children. When asked if there were any pupils in the room who had been more than one year in that grade the teacher would present them for examination. It was then discovered they invariably showed some defect of eyes, nose, throat, or general nutrition.

We noticed another significant feature of this work — one teacher would state there were no children in her room who needed attention — in the same building, in another grade, the teacher was prepared to name a number who should be referred to the inspector — thus demonstrating that some teachers are already alive to the importance of the work and are interested in the physical as well as the mental welfare of the little ones in her charge.

I have some interesting figures furnished me by Dr. Mann. From 660 children examined below the high school, 559 were referred to the family physician. Of these 122 were one year behind their grade; 62 were two years behind; 41 were three years behind; 17 were four years behind; and 9 were five years behind. This means that 254 pupils were in school at an expense to the State and city from at least one to five years longer than the normal child. This number, 254, would form six classes, requiring six teachers, at an expense of $3,000 to $4,000. It costs us about $20 per year for each pupil in the grade schools, so these delinquents cost us over $5,000 in addition to the salaries of the teachers. Should any of this number become truants, or develop

into criminals, the expense would be greatly increased. An overgrown laggard in a class with younger children has a demoralizing effect and his presence tends to lower the tone and discipline of the entire class.

We have just awakened sufficiently to realize it will be economy to employ a school nurse, whose duty it will be to endeavor to reduce the number of children in this class.

The fact that children assemble at school from so many homes and varied conditions makes the school a favorable medium for the spread of communicable diseases. These little ones, who have been so jealously guarded at home, are obliged to attend school and there become exposed to the danger of contracting scarlet fever, diphtheria, measles, whooping cough and other diseases; and they invariably acquire them along with their education.

If the law compels children to attend school, it is their personal right to demand that they be protected from the dangers of disease. If we could bear in mind the children who died in this State last year from the communicable diseases of childhood, and could summon before us the greater number who have escaped with some function or faculty crippled by disease, we might ask ourselves if an education is of such tremendous importance that the life and health of these innocents must be risked in order that they may attain it.

No system of education is rational which does not teach the hygienic relation of mind and body. It is more difficult to instruct adults than children concerning the principles of preventive medicine; in the school we have an organized, well-disciplined company of receptive minds whose nature is to receive instruction, and we shall do well to begin here in our propaganda of public health work. Time does not permit me to elaborate this phase of our subject.

Just as the school lends itself as a favorable medium for the spread of communicable diseases, it also affords a place where these diseases may be detected early, and where measures may be taken to prevent their spread.

In Poughkeepsie, when the health officer is notified of the existence of such a disease, he in turn reports the same to the superintendent of schools, giving the name and residence of the patient. His records are consulted, and all other children under that

roof are excluded from school. This precaution at times is uncalled for, but I find it safer and wiser to adhere to one ruling than to act on each individual case. This period of exclusion is continued until the health officer issues a permit to the patient to return to school.

When any of these communicable diseases are prevalent, the school inspector cautions the teachers and advises them concerning the early symptoms of the disease. When a pupil shows signs of fever and sore throat, or coryza and cough, etc., the little one is sent home. Sometimes the teacher's alarm has been unfounded, but while she inconvenienced one child, she protected forty others.

Another proceeding we have found of service is to follow up the absentees. When a little one is not in his accustomed place at school the teacher requests one of the class living in his neighborhood to call at his home and ascertain why he is absent, and if he is ill, the cause of the illness. If the returns are suspicious, the inspector or health officer is notified.

By this means we have been able to discover mild cases of scarlet fever and measles that otherwise would have escaped detection. These measures surround the school with precautions that tend to prevent the spread of communicable diseases.

I regret I have been unable to cover the entire field suggested by the title of the paper. I have touched but a few features that have come to my personal attention. Others, writing upon the subject, would approach it from other viewpoints, and develop equally important phases of the work that I have not brought out.

We all must agree that we have not fully developed the possibilities offered by the public school for preventive health work. Dr. Warbasse, in his work on "Medical Sociology," says, "When the medical profession becomes the champion of the strong man, of the growing youth, and of the lusty babe, as well as it has for countless generations been the champion of the sick and the distressed and puny, then it shall conduct humanity to victories yet undreamed, then shall the physician be not only helper, but he shall be leader also."

COMMISSIONER PORTER: The next paper deals with a most important part of this work. It is entitled, "Follow-up Work," and it will be presented by Dr. Franklin W. Barrows, Medical Inspector of Schools, in Buffalo.

PUBLIC SCHOOL INSPECTION FOLLOW-UP WORK

By FRANKLIN W. BARROWS, M.D.
Medical Inspector of Schools, Buffalo, N. Y.

Medical inspection of schools has been on trial long enough to prove its efficiency in discovering the physical defects of school children. If statistics of morbidity were all that the intelligent public demands, there would be little more that the medical inspector could do to completely fill the bill. To this function, however, there is added the duty of excluding from school all children physically unfit for school work. The result of these two lines of activity has usually been to drive a considerable proportion of children out of the schools without making any definite provision for their return. As one of the boys has expressed it, "The doctor chases the kids home and then the truant officer chases them back to school again." That even this crude practice produces good results in ridding the school of contagious diseases, we will all grant; but it is imperfect in that it wastes many days of the pupil's time, and that means a waste of the resources of the school and of the health officers concerned. A little experience of this sort is enough to convince any community that medical inspection must be carried further; that once the inspector has discovered a pupil with any sort of defect, it must be his business to follow up the discovery with appropriate measures for the mitigation or cure of the defect. In other words, medical inspection is but one function in a system of medical supervision. Medical supervision includes medical inspection, as the greater includes the less. Broadly speaking, it is a part of our great policy of conservation. It means conservation of health, of time, and of the revenues expended in maintaining our departments of education and public health.

Dr. Gulick, of New York city, in a recent magazine article (*World's Work,* August, 1910), states that the number of graduates from our public schools is equalled annually by the number who drop out of school without completing the course. He adds

that 16 per cent. of these children drop out of school because of ill health. Even those children who persevere to the end are greatly retarded by removable physical defects, making their schooling longer and more expensive to their parents and to the taxpayers than it ought to be. This is only a part of the argument, if argument is necessary, for the following up the many abnormal children in our schools to the end that they may be restored to their normal health, or, at least, raised to a higher degree of physical and mental efficiency. There is reason also for promptness in remedial measures, for every physician knows that a serious physical defect has a tendency to become aggravated by neglect, and that, notwithstanding the too prevalent notions as to the outgrowing of the afflictions of childhood.

There was a time, not long ago, when the medical inspector fondly believed that it was merely necessary to request the parents to place their children under suitable medical care and all would soon be well. But such Utopian hopes were quickly dispelled. At once the laity exhibited a most surprising confidence — not in the doctor, but in the *vis medicatrix naturæ,* although they did not call it by that name. I remember a pathetic example coming under my own observation. A boy in one of our parochial schools was suffering from a chronic inflammation of the eyes. The parents were asked to do something for his relief. To my great astonishment the mother replied that one of her neighbors had assured her that her boy would entirely outgrow the disease when he was twenty years old. The lad had only ten more years to wait. Every medical inspector could tell a similar story — a story of ignorance, neglect, prejudice, inhumanity. The fact is that in New York city up to about three years ago less than ten per cent. of the parents receiving official notices reported any action in behalf of their children. In the hope of devising a more systematic plan of action, the authorities bethought themselves of the school nurses. Three schools were selected in different parts of Manhattan, and with the aid of the nurses a six weeks campaign was inaugurated in behalf of the children needing medical attendance. I will quote the results as given in the report of the Bureau of Municipal Research (A Bureau of Child

Hygiene, page 6): "The parents who did not respond promptly to the department's customary postal notification that their children needed treatment, were interviewed either at school or at home, with the result that over 95 per cent. either took action or requested the department's nurse to act for them. In three-fourths of the cases only one interview was necessary, while the cost in nurse's service per pupil treated was only about sixty cents. Even this figure could be considerably lowered in well-established work.

Before taking up in detail the features of an ideal follow-up system, let us review the different factors in the transaction and find out who's who? First there is the child. Let us not forget that the child is the center around which all our system revolves. The State sees in the child a future citizen. The State brings all good influences to bear upon the child in order that the fathers and mothers of the next generation may be adequately prepared for the requirements of life. We must bear in mind that we are dealing with children not for the glory of the Department of Health nor the dignity of the Department of Education, but just for the sake of the children themselves. Montaigne has said, "We are taught to live when our life is well-nigh spent." Modern education is ambitious to reverse this principle and to prepare for life at the very threshhold. In our official work, therefore, we cannot afford to get out of sight of the child. We may take warning from the observation of the good Dr. MacKenzie, who has been identified with this work in Scotland, that "as in public health, so in medical inspection, there are some signs that the living child is beginning to be lost in the maze of dead figures."

Then there is the teacher. She is a confederate whose help is most essential at every step in conserving the welfare of the child. So much reliance is placed on the teacher in our present system of medical inspection that some critics have thought they could ridicule it by calling it "teacher inspection." Very well, let them call it what they please; but they will find that no system of medical inspection of schools, however elaborate, can ever succeed without the whole-hearted co-operation of the teaching staff. It is the teacher who first observes the ailments and defects that

interfere with the normal progress of the child in his school work. Imperfect vision and hearing, mouth breathing, coughs and colds, speech defects, mental defects, and a hundred other variations from the normal standard attract the attention of the observant teacher before the child comes within reach of the medical inspector. The teacher inspects the school every day and should be on the alert, as she usually is, to detect those who need medical care and bring them to the notice of the proper officer. Moreover, the teacher is generally the custodian of the records of physical examinations in her class room. As keeper of these records, it should be made a part of her duties to assist in following up the cases that need medical care and to see that the results are properly credited on her accounts. You will rarely find a teacher who will not undertake this work with enthusiasm. You will frequently find that the teacher or the principal is the very best person to confer with parents and persuade them to secure proper medical attention for their children. Indeed, you will fail miserably in the work of medical supervision if you allow the least feeling of antagonism to mar your relationship with the school authorities. The medical inspector must realize that his own work is nothing if not educational. He will then recognize the teachers as an army of colleagues.

The next important factor is the parent — the crux of the situation. If the schools could only teach the parents the things that they are teaching their children, if the medical inspectors could only remedy parental defects — then the pathway of public education and public health would be strewn with flowers in fragrant and magnificent bouquets. But alas, too many of the parents of this generation are characterized by unfitness for their function, and many, very many of the children require other care than that which their homes afford, at least for a great part of the time. Parents who fail to realize their own defects will be very skeptical concerning the alleged defects of their children. I remember calling upon a mother of three children and urging her to relieve them of adenoids which were forcing them to breathe through their mouths, and retarding them in school. The mother herself had the typical adenoid facies, and her mouth was never closed except to swallow. She did not wait to hear all

that I had to say, but blurted out in a voice that was thick and indistinct, "Yes, I guess I know what youse all want. The doctors was after me too, when I was young; they said they wanted to cut something out of my t'roat but we wouldn't let 'em; an' you can look at me now and see what I am to-day." I did look — and fled!

But, whether wisely or unwisely, the parent controls the situation and in all our efforts to improve the physical condition of children, the parents must be met, persuaded, conciliated. In our medical work we shall be successful in the highest degree if we avoid all flourish of authority and act in an advisory way. If parents are suspicious of our motive and if they distrust our judgment it will take a great deal of tact and wisdom to swing them into line with modern medical and sanitary progress; it will require a persistent campaign of education. But in our dealings with fathers and mothers as they are to-day, let us not forget that the school nurse of New York city holds the record of persuading 95 per cent. of a possible 100 per cent. to take definite action as directed by the inspectors, and that in three-fourths of these cases the nurse had only one interview with the parents.

I now approach with some timidity the subject of the family physician, realizing that as an attaché to the Department of Health it is one of my chief functions to exalt the members of the medical profession in my community. But our records show that there are doctors and doctors, and I am sorry to add that it would be easy to be present documentary evidence here to show that a few of our doctors are inclined to obstruct rather than to advance the work of medical supervision. They claim the right of way for themselves, and therefore they want the whole road, whether they are going or standing still. Lest I might unintentionally say something unjust of the practitioners in our own commonwealth, I will say nothing. Let us rather hear what an English physician, Dr. Hogarth, a medical officer of the London County Council, has to say about the situation in London (Med. Insp. Schools, page 231):

"It is remarkable that, in certain matters affecting the public health, many members of the medical profession appear quite devoid of conscientiousness. They constantly certify children as

free from infectious and contagious disease, and as fit to attend school, when they are obviously suffering from ringworm or scabies; and sometimes even in the case of diphtheria their action is not above suspicion. For example, out of 240 certificates of freedom from ringworm, no less than 234 were proved to be inaccurate on microscopic examination of specimens from the affected cases."

Commenting on this statement, Dr. Kelynack, in his recent book on the Medical Examination of Schools and Scholars, says (page 228):

"Objection (to school clinics) is raised by general medical practitioners. In the past, at any rate, they have proved themselves unequal to the task of keeping the children in good health. This has probably been due to some extent to neglect on the part of the parents, but there has also been some fault on the part of the doctors."

There are inspectors in New York State who can testify that it is discouraging to the point of vexation to send a child to the family doctor for treatment and then to be met with their brief answer that there is nothing at all the matter with him. But these annoyances, after all, are only such as must be met with at the beginning of any innovation — and medical inspection, from any other point of view than that of the public health service, is an innovation in school life. To the credit of the medical profession in general it should be said that they are supporting the innovation loyally. Many of our private physicians were insistent for years on the establishment of this service, and it is due to their efforts in very large degree that we have medical inspection in our schools to-day. We hear little of the old objection that the school doctor is depriving the family doctor of his living, for facts have long since proven the contrary. There is, therefore, less excuse now than ever for indifference or opposition to medical inspection on the part of the profession. The medical inspector ought to meet all physicians as colleagues in the important work of child salvage, and in recommending medical treatment for school children he should beware of being too fussy and thus courting the unfavorable criticism of the family doctor. In matters medical, the habitual alarmist is cheap and undignified and his appeal is disregarded by thinking people.

The school nurse is an indispensable member of our working force. Wherever she has come into the work of medical inspection, she has come to stay. In fact, many if not most of the existing systems of medical inspection of schools have had their beginnings in the volunteer work of some district nurse who has demonstrated to the public the need of systematic inspection and the way to supply the need. When all our forces are lined up for action, the nurse will be found especially suited for field work. Her tact and her powers of persuasion are put to most excellent use in visiting reluctant parents and inducing them to attend to the needs of their children. She can also give instruction in the simple rules of hygiene which are so frequently ignored or violated in the homes from which our weaklings come to the school. She will aid overworked and careless mothers in the neglected task of cleaning their children and keeping them clean. In fact, the school nurse is a teacher just as much as the woman who spends all her time in the class room, and she has the added privilege of teaching the old as well as the young. We have mentioned only a few of the lines in which the school nurse works to the best advantage — the number of different ways in which the nurse can be of service in a well organized system is limited only by the number of nurses and the size of the field in which they work.

Our survey of the field would be incomplete without a few words as to the medical inspector himself. He makes the inspections of which we have been speaking. He decides what cases are to be recommended for medical care and treatment, but he does not treat the cases himself, neither does he dictate the mode of the treatment or the physician who is to have charge of it. He must take an active interest in following up all cases that he recommends for medical treatment; otherwise much of his routine work will prove to be useless. Cases of contagious disease coming to his notice he must follow up himself until they are quarantined. He is not a truant officer in any sense of the word and when he is sent to the homes of absentee pupils, as is often the case, he should not be expected to usurp the functions of the truant officer. He will find himself obliged, however, to divide his time between the school and the school district. I cannot do

better than to read some observations which Dr. Hogarth makes on this point (Med. Insp. Schools, page 151):

"As soon as the doctor begins his work in the schools, he will find it useful to obtain first hand knowledge of the social conditions of the people in the district where the schools are situated. It is impossible fully to appreciate the life and home conditions of the children whom he inspects, unless he understands not only the ignorance, the apathy and the neglect of the parents, but also their poverty and the wretched conditions under which they live. In the poorer quarters of the town he meets the neglectful, the criminal and the apathetic parent, as well as the honest, hard-working underfed laborer, and the thrifty housewife who can scarcely keep her home together. Each of these sends a different type of child to the school, and the doctor must be able to understand and recognize each type; otherwise he cannot diagnose the case, and each must be treated on its merits. In another part of the town there may be congregated the spoiled, the pampered and neurotic children of different social status. In the rural districts also he must know the parents and their ways. This first hand knowledge is not easy to obtain except by living among the people. It is, however, possible to acquire reliable information from the teachers, and the school doctor must not hesitate to instruct himself in this way in the absence of personal knowledge."

In accordance with these opinions of Dr. Hogarth, I do not hesitate to say that the medical inspector should be a practising physician who gives up a part of his time to this work and has his own professional interests to look after also in the community where he works. I believe that in this way he will serve the schools better than the man who is hired to give all his time to medical inspection and is inclined to look at everything from the official point of view. Finally, one very essential qualification of the doctor is the habit of following up himself and bringing his own work up to the standard, for no one who lacks this quality is capable of following up the work of other people.

In conclusion, I wish to present a mere outline of an efficient follow-up system. It will combine some of the best features of methods now in successful operation. The finer details of the work will have to be devised, of course, to meet the needs of each community.

1. The child is inspected by the medical inspector and his defects noted in a permanent record. If treatment seems advisable

a notice is sent at once to the parent. If the child is mentally defective or physically unable to attend to his work in the regular grades he is a candidate for one of the special schools, viz.:

2. The fresh air school and the ungraded school for mental defectives. In these two schools the pupil is under the direct supervision of the inspector and his regime is subject to change and regulation by the inspector; he is followed up every day.

3. Parents who do not respond to the first notification within a reasonable time receive several other notices at regular intervals. For this purpose the postal card used in several cities is cheaper than a personal call and just as effective for the preliminary work.

4. When notices are of no more avail, the case is referred to the school nurse and she visits the home for the sake of answering questions, meeting objections and educating the parent to a sense of responsibility.

5. Cases of special obstinacy combined with special need on the part of the child are reported to the head of the service and dealt with on their merits. In this work the charitable organizations, societies for protection of children and other philanthropies are often of great aid.

6. To insure the greatest efficiency, the greatest economy of the time of a staff of salaried doctors and nurses, this work should all be directed from a central office where there is sufficient clerical help to receive reports from the field and to follow up the record of each child until his case is settled. This office can attend to mailing notices to parents and assigning daily work to nurses, and to some extent, to the inspectors.

7. Cases of skin disease, pediculosis, and occasionally other ailments that are not likely to make rapid recovery in the home may be treated by the nurse, either at home or in the school. Experience has shown that this work does not encroach on the province of the practitioner, and that it does save to the child many precious days of school attendance which would be squandered if the child were to be excluded from school until well. Indeed, this work of the nurse has been so productive of good results that many schools are equipped with the appliances for treating simple ailments, and the nurse has her regular days for

the work. In England and other European lands and in some American cities this agency has developed into the school clinic. Special clinics for the care of the teeth, for the eyes, etc., are also maintained with excellent results in some cities.

I think I hear from some quarters the cry of "Paternalism!" The man who wants more free medicine for his hogs and cattle is likely to be shocked at the expenditure of money by the Department of Health in the interests of another man's children. Let us remember that no true service that we can render to a child will ever have been performed in vain. The men of the future, when they come to pass judgment on our present work, will not condemn us for having done too much for the child. They will wonder why this generation could not have treated its children more liberally — more wisely — more in keeping with our present knowledge and opportunities.

COMMISSIONER PORTER: There will be a clinic to-morrow afternoon at 2 P. M. There will be some very interesting cases of tuberculosis shown, and there will be a demonstration of the diagnosis of incipient tuberculosis.

This very instructive and stimulating paper to which we have listened on school work will be followed by a very important paper on school hygiene by Dr. Edward Clark.

I take pleasure in presenting Dr. Clark.

DR. EDWARD CLARK: I want to offer a word of explanation. Dr. Porter asked me to prepare a paper, and he suggested as a topic, the "School as a Factor in Unhealth." I thought the matter over a few days, and I wrote and asked if he had any objection to the title "School Hygiene and School Disease." Well, they say a fool never changes his mind, but a wise man does. I changed my mind and went back again to the original suggestion, so that the title of the paper I shall present to you is "The School as a Factor in Unhealth," as suggested by Commissioner Porter.

THE PUBLIC SCHOOL AS A FACTOR IN UNHEALTH

By EDWARD CLARK, M.D.

Medical Officer, State Department of Health, Buffalo

The true function of education is to develop the ideal citizen; not a citizen with an overtrained mind in a poorly developed body, but an all around educated citizen with a sound and well-trained mind in a sound and well-trained body. That such a citizen is a valuable asset to a nation was fully recognized more than two thousand years ago in the schools of Ancient Greece; in those schools "the training and care of the body was regarded as of equal importance with the training of the mind. In the Greek world physical education was a reality. It was a natural education of the child's body directed in part to securing healthy growth and strong physique, and partly to create a favorable reaction upon the child's mental and moral activities."

"Man," to quote Mr. Freeman, "was a whole to the Hellenes, and one part of him could not be sound if the other parts were not. A school which trained the minds only, and neglected the bodies of the pupils would have been inconceivable to a Hellene." This was regarded as good school doctrine six hundred years B. C. It is a somewhat long stride from 600 B. C. to 1910 A. D., but how much have we advanced in these matters since then? Has school advancement and school hygiene kept pace with other departments of advancing civilization? On the contrary, have we not retrograded concerning the true and proper methods of educating the young and growing minds and taking proper care of the young and growing bodies of our school children? Since the early Grecian times there has been no adequate system of national education, and school hygiene is the newest and youngest branch of state medicine. Until quite recently the study of school hygiene had been confined to a few advanced thinkers.

In the seventeenth century "Comenius, the father of modern education, evolved an educational system in which school hygiene certainly found a place. He constantly urged the necessity for

physical training, and emphasized the importance of providing airy school rooms and pleasant playgrounds. He insisted that educational methods should be in accordance with nature. Moreover he was fully aware of the importance of adapting the school routine and curriculum to the physical and mental needs of the children."

Here we find the father of the modern playground, the fresh air school, and the schools for the mentally and physically defective. Comenius lived and taught in the seventeenth century, nearly three hundred years ago, and yet it has taken from then until now for his doctrine to begin to bear fruit. Modern civilization is just awaking to the importance of the truths he taught regarding school hygiene.

Now, speaking of school hygiene, I find in the *Atlantic Monthly* for June, 1908, an article by William H. Allen, which sets forth my ideas on the subject so much better than I can express them myself that I cannot forbear quoting from it.

"Until quite recently the term school hygiene stood for one idea, namely, compulsory instruction in physiology and hygiene, more particularly in the evils of alcohol and nicotine. In the near future school hygiene will suggest practice, not precept; not class-room recitation by pupils, but control of school environment by school authorities; not ideas to be conveyed to the brain of the child, but protection to be given to the child's body. While it is true that heretofore but a small number of men have seen the need of this new definition of school hygiene, those few men are now proceeding with such thorough and skillful educational methods, and with such profound conviction, that the school world is bound to respond to their leadership."

There are many evidences that the time is ripe for recognizing as an important factor in hygienic instruction the hygiene practiced at school by janitor and teacher, and by curriculum and building-makers. Chicago is enthusiastic over its Bureau for Child Study; Cleveland, over its Department of School Hygiene; Philadelphia, Memphis and Utica, over examinations for defective vision; Detroit, Montclair and the Oranges, over their school nurses; and Massachusetts, over its Medical Inspection Law. Several hundred representatives of charities and correction from all sections of the United States and Canada, meeting at Minneapolis last June,

gave special attention to the limitations of the present hygiene. The second International Congress of School Hygiene, which met in London last August, gave a week to various phases of the new hygiene. Even more direct and more continuous results are promised by the American School Hygiene Association, organized by a group of representative educators, physicians and social workers in May, 1907, to secure for all schools of all states what Dr. Luther H. Gulick so aptly terms "biological engineering."

I might add to the above that almost all of the large cities in the United States are rapidly coming to realize that there is something radically wrong so far as school hygiene is concerned, and are getting wise to the fact that there is great room for improvement. I am informed by the Wess reports that a couple of open air schools will be a reality in this city in a very short time. This is news that can be hailed with much joy, for it is one of the harbingers of a new era of reform, better late than never. Let us hope that in a short time public spirit may be so much aroused that the United States, which leads the world in the education of the masses, may in the near future, be found in the front ranks of progress in this important and enlightened reform.

We are all very proud of our common schools. We call them the bulwarks of the Nation. We pay liberally and cheerfully for their maintenance; in them the large majority of our future citizens receive their only scholastic education; in them our boys and girls spend from ten to fourteen years of their young life, when the body and mind are in the formative state, and when they are much more liable to lay the foundation for good or poor health than at any other period of life; when they are more prone to diseases which make for chronic invalidism than at any other time. In view of these facts is it not our imperative duty to enter into an analysis of the school question, and to carefully determine whether all is being done that can be done to produce the best possible results both physical and mental from the hygienic standpoint, and to determine just what position the school occupies as a factor in unhealth.

So much by way of preface. I now crave your indulgence for a few moments in order to set forth a few things which to my mind make the schools an important factor in unhealth.

First, I have always held the belief that the school year, especially in the grammar schools, is too long. These schools ought to close at least by the first of June. It would do no harm to have them closed until October 1st, so that the pupils can spend the most delightful months of the year out of doors in the parks and meadows, storing up health and energy, and getting acquainted with nature and mother earth; the poet sings, "What is so rare as a day in June," and the teachers and pupils of our modern schools can say what is so distressing as a day in June, when one is confined within the four walls of a schoolroom, when all nature cries aloud to get out of doors. My friends of the pedagogic persuasion would say in answer to this, that if we shorten the school year we must shorten the curriculum. I say, let us shorten the curriculum by all means; for what shall it profit a boy or girl if they gain the whole world of knowledge and lose their health?

There are more things in the modern curriculum than were ever dreamed of in our philosophy, and many of them could be dropped to the benefit of the child. I am persuaded that a boy or girl would gain more of permanent value by spending the sunny June days in the open air, than by spending six hours a day for five days a week in a schoolroom, trying to learn and remember what emperors or rulers led the seven different crusades against the infidels in the Holy Land; whether King John in the twelfth century had a right to name the Archbishop of Canterbury as against the Pope's wishes; trying to extract the nth root of x^2 times y to the nth power.

A short time ago in a lecture to Cornell students, our very efficient Commissioner, Dr. Porter, speaking of tuberculosis, made this statement: "No other disease produces so much poverty or distress. One-seventh of all deaths are due to this disease. One-third of all deaths among adults and one-half of all the sickness is due to tuberculosis. At the present rate of mortality from tuberculosis in ten years we shall lose 2,000,000 people. This is more than we have lost in any of our wars."

He might have added that a very important factor in the production of all this disease and sickness was the confinement for

so many hours a day, and for so many months in the year of weak, poorly fed and poorly nourished children in crowded and poorly ventilated schoolrooms.

Many of our school buildings are a strong factor for unhealth due to lack of proper lighting and ventilation. The subject of proper ventilation of school buildings is still an unsettled problem, and its proper solution in the future will depend to a great extent on expert engineering skill. Some of the more modern buildings are pretty well provided for in this direction, but we do not have to go far afield in any of our large centers of population to find many school buildings where it is frequently necessary to open windows and doors during school hours to regulate the heat and fresh air supply.

Another factor which makes for unhealth is the dry sweeping practiced in many of our schools. Of course while this is going on all the windows of the rooms are supposed to be open, but I have found on inquiry that this is not always the case. After the dust has settled the windows are closed, and some hours later the desks and furniture of the room are dusted off with a feather duster or a dry cloth. In this dry sweeping and dusting, of course, many of the disease germs contained in the dust are blown out of the windows, but how many are left to get into the noses, mouths, throats and lungs of the pupils I leave for your imagination to determine.

I am informed by the educational department of the city, that when the schoolrooms are being swept, sawdust soaked in oil and colored with paris green is used on the floors as a dust absorbent and disinfectant. I cannot find that any antiseptic is ever used in the water with which the floors and other woodwork are scrubbed. I cannot find that the desks are ever scrubbed or treated to an antiseptic bath; no vacuum sweeping is employed in any of the schools in this city. I made some inquiries from janitors at the suggestion of the department, and learned as follows: that schoolrooms are swept every night; halls are scrubbed once a week; other rooms once in three or four weeks. I asked the question, "Are all windows of the room opened when it is being swept?" Answer, "Part of them." I was told that the

desks and other furniture of the rooms were dusted twice daily, at night with a feather duster, in the morning with a cloth.

Another potent factor which makes for unhealth in the school is the attitude of indifference on the part of the school authorities toward such defects of mind and body as might materially affect the chances of success and happiness of the child, unless such defects were of the more alarming nature of contagious diseases.

"The lockstep" has been the rule in physical matters as in the realm of the course of study. All the children have been received on an equality, and have been treated equally, no matter what their mental endowments or physical condition. The quick and the slow, the sound and the sick, have been grouped together, and he who could not keep pace in his studies has been as unhesitatingly left behind as has he who through illness could not retain his place in the school.

Years ago and in some schools recently, the backward child, the one who seemed stupid and restless, and unable to learn, received a dose of the rod. To-day far better results are obtained by copious doses of fresh air and sunlight, together with proper nourishment. The proof of this is shown in the results obtained in various schools where teachers, who have tried the above methods, prove by figures that backward children show an increase in weight, lessened absences from ill health, and far superior mental tone and brightness. Overcrowding, which occurs to a greater or less extent in many of our city schools, is another element which makes for unhealth. It is as unhealthy as it is unnecessary, in fact such overcrowding as I have observed in some schools is nothing short of criminal.

Finally, let me say that the schools play an important part in unhealth by serving as centers of exchange for contagious diseases which pass from pupil to pupil. This fact is recognized occasionally by closing public schools in times of serious epidemics. Notwithstanding the fact that the schools serve as centers for the propagation and spread of contagious and infectious diseases, the occasional closing down and the rare fumigation have constituted the sum total of preventive measures, with the single exception of the commonly insisted on requirement of vaccination.

Now, I want to quote an editorial which appeared in this morning's *Express*. It is entitled "Worthy Movement," and is as follows:

"Health Commissioner Fronczak recommends that a dentist be appointed to make regular examinations of the teeth of school children. He believes that it would be possible for one dentist to visit about three schools a day and, in addition, to give helpful lectures, showing children how to care for their teeth. The introduction of a dentist among the medical school examiners in this city would be in line with what is being done in other cities.

"It has long been recognized by educational authorities that a large part of the inferior work which is done by some children can be traced directly to physical defects in the pupils. It may be the general condition of health, poor eyes, poor teeth, growths in the throat or nasal passages or any one of a number of other defects. It has been proved by abundant experience that the removal of the defect tends to make the child normal. Further than that, much of the trouble with juvenile offenders has been traced to these defects."

"The public-school system was organized to train children into good citizenship. It is obvious that anything which interferes with reasonable work in the schools interferes with the development of the child along normal lines. If the schools are to serve their highest purpose, it is necessary that there be supervision of the health and physical condition of pupils as well as of their mental development."

COMMISSIONER PORTER — I am sure I voice your sentiments when I say we are glad indeed to welcome to our platform a distinguished representative of the State Department of Education. Dr. Finegan has always taken a sharp interest in our work, and I think it is only fair to say it is due to his energy that we have an increased inspiration in public health and hygiene in many of the schools.

It gives me great pleasure, gentlemen, to introduce to you Dr. Thomas E. Finegan, Assistant Commissioner of Education.

THE SCHOOL AND PUBLIC HEALTH FROM THE STANDPOINT OF THE EDUCATIONALIST

BY THOMAS E. FINEGAN, Pd.D.,

Assistant Commissioner of Education

MR. CHAIRMAN, LADIES AND GENTLEMEN — I esteem it a great pleasure as well as an honor, to have an opportunity to say just a few words to this representative body of physicians and health officers of the State of New York. I must confess at the outset a feeling of embarrassment, because it was not my understanding that prepared papers would be submitted. I have not, therefore, followed the excellent examples of the gentlemen who preceded me and prepared a paper on the subject assigned by the president of this conference. I have listened with much interest to the papers already presented, because of the same views expressed in them and the care and intelligence shown in their preparation. Perhaps I should also say at the outset that the views expressed by the speakers who have preceded me have in most cases my hearty commendation. Of course, you cannot expect a pedagogue to agree absolutely with all the views expressed by three physicians upon the questions which have been before you for consideration.

I shall speak very briefly upon three or four divisions of work which are related to the general questions under consideration and in which the Education Department is vitally interested. First, the question of medical inspection of school children. In my judgment, there can be no serious doubt as to the advisability of this inspection. The law of the State, however, is not expressive upon this point. There is nothing mandatory in the general statutes about it and the only law relating to the subject is that found in many of the local charters or local acts governing the several cities of the State. Nearly all of the cities are making suitable medical inspection in the schools and in as satisfactory form as could be expected under present conditions.

At the request of Dr. Porter, the Education Department ex-

pressed willingness to co-operate with the Health Department in the adoption of a plan of medical inspection of pupils in all union free school districts and in villages of 5,000 and more population. That plan has been in operation for three years or more, so that at the present time all children in attendance upon school in the union free school districts, in villages employing superintendents and in cities, have undergone an annual examination and inspection as to the condition of the eyes, ears, nose, etc. Of course, this plan of inspection has not been as thorough and on as broad lines in the union free school districts where the examination has been under the direction of teachers under instruction from the Health Department as it has been in the cities where the examination has been conducted by health physicians under the direction of the Board of Education. Upon this point there is one question fundamental to all school inspection, which should be strictly observed in every school district and in every city of the State where medical inspection is undertaken. It must always be understood that the schools in every particular are under the control and direction of the school authorities. When physicians or members of the Health Department go into a public school for the purpose of making an examination of pupils, such physicians should always go under the direction of the Board of Education. There should be no division of responsibility for any of the work directly related to the public school system, and this responsibility should always be borne by the school authorities or the Board of Education.

The second topic upon which I wish to say a word is the sanitary conditions of school buildings. There is no class of men in the State who should be able to render the Education Department and the children in our schools greater service in providing proper and adequate school accommodations than the physicians and health officers who make up the membership of this body. The law now provides that no public school in the State, outside of cities of the second class, shall be constructed, remodeled, repaired or added to until the plans and specifications therefor are first submitted to the Education Department and have the written approval of the Commissioner of Education. The heating, lighting and ventilation must conform to a certain standard be-

fore they will be approved, and what is now regarded as the best methods of heating, lighting and ventilating must be adopted. In order to prevent local school authorities from violating this law, the statute provides that the Board of Education shall not have legal authority to issue a tax list to raise funds to construct, repair or remodel these buildings until it has secured the approval of the plans therefor from the Commissioner of Education. The statute formerly provided that no building should be constructed or no addition made at a cost of $500 or more without the approval of the Commissioner of Education. It was found that local authorities would often try to beat this provision of law by voting to *repair* a building when in reality they were constructing an addition; but as the statute now reads, all plans for the repairing or remodeling of buildings must likewise be approved as in the case of original construction or additions.

A Department Inspector found some years ago in one of our thriving villages one of the most dilapidated school buildings in the State. The board of education was informed that the building did not conform to the statutes, that it was insanitary, that it did not provide adequate school accommodations for the district, that it was not worth repairing and that a new building ought to be erected which would be expressive of the progressive spirit of this enterprising village. The question of voting proper appropriations came before the voters of the village at several meetings, and it took three years to get that community to vote a suitable appropriation for the construction of a school building affording adequate and sanitary accommodations to its children.

The physician or health officer in a community is usually a man of influence. He can exert great influence over his fellow citizens in bringing them to that frame of mind where they will cheerfully sustain sufficient appropriations to provide adequate school accommodations in the community. It frequently occurs in communities where a contest is on relative to increased or better school facilities that some man of local influence will say in a public meeting or in an article over his signature in the local paper that the school building is as good as it was when he attended school, and that if it was good enough for him and his children, it is good enough for

the children of the present time. When such a statement is made, or when such an article is written, there ought to be no man in the community who can exert a greater influence in formulating public sentiment upon this question than a reputable physician or health officer. It is your duty in such a case to immediately point out the error in the statement presented and set forth your views for the reason why the school building should be repaired or remodeled, or a new building constructed and you should avail yourselves of every opportunity of this kind to not only render a great service to the children and people of your community, but to the State as well.

We have on the statute books of our State a law which provides that all children between the ages of 7 and 14 in cities and villages of 5,000 inhabitants or more shall be under instruction from the time schools open in such cities or villages until these schools close for the year, and that outside of the cities and villages, or in what we term the rural districts, all children between 8 and 14 years of age shall be under instruction from October 1st to June 1st following, and that unless such children are employed in accordance with the labor laws of the State they shall be under instruction between 14 and 16 years of age as well. Now if the laws of the State are to require that these children must be put into schools and kept there every day when the schools are open, why should not our laws reach out and require with the same force that these children, required to be in school, shall be properly protected by being afforded school buildings which afford sanitary and comfortable surroundings?

While I was greatly interested in all papers which have been presented, I was particularly interested in the paper of Dr. Clarke, because he made the statement that we had not yet reached that point anywhere in this country where we gave instruction in school hygiene. I have in my hand here an elementary syllabus, prepared by the Education Department for the use of the public schools of the State. It went into operation September 1st last. When a boy in the public schools I remember having been taught that there were a certain number of ribs in every man's body and I always believed that what was taught me in this respect was the truth, and yet within the last month a leading surgeon in the State has made the statement that about 20 per cent. of all people have

either a greater or a less number of ribs than the boys twenty years ago were taught each human body contained. I do not know of what particular value it may be to a child to know that he has twenty-four ribs, or a greater or less number, to protect him through life, but I do believe that the time which has previously been devoted to teaching facts of this kind to the children of the State has been wasted and that we can give them instruction along certain lines which shall be of a real service to them throughout life. Of course we must remember that under the law of the State we are compelled to give instruction on health with special reference to the effects of alcoholic stimulants and narcotics on the system. The teachers throughout the State are conforming to the spirit of that law and giving such instruction. That law was so framed that it is necessary to divide our instruction in physiology and hygiene, or school hygiene, as we may now call it, into three courses. We must also consider the fact that there are about one and a half million children in the public schools of this State and that only about one hundred twenty-five thousand of these children go into institutions of higher learning and that probably 50 per cent. of these children leave the elementary schools at the end of the sixth year and receive no further instruction. The importance, therefore, of providing proper instruction in hygiene and sanitation which may be given to this million and a half children in the school and brought within their intellectual grasp within the first six years of our school work can readily be recognized.

The first of these courses is for the children in the first, second and third years. The instruction given during these years is oral and consists of two lessons a week for not less than ten weeks, or an equivalent. The second course covers the fourth, fifth and sixth years' work in school and the law requires that in this course instruction shall be based upon an elementary text book. The third course covers the seventh and eighth years.

I shall not read to you the outline in these courses of study, but I do want simply to refer to some of the subjects as they are treated in this syllabus so that you may form a better idea of the character of instruction which is to be given in the future in the subject of physiology to the children in attendance upon our public schools. The instruction is on subjects like these: " The body, the

blood, flesh." "The growth of the body." "The need of food, pure air, pure water, exercise and rest." "The necessity of common sense in the use of these things." "Food, and its use in the body." "Care and preparation of food." "Our meals." "Air, and its use in the body." "Breathing." "Water, and its use in the body." "Care of the body." "The voice." "Contagious disease." "Accident and emergencies." "Exercise, rest and sleep." "The joy of health and strength."

All of these topics come within the first year's instruction and the foregoing are suggestions and directions given to the teachers and of course are much elaborated in the syllabus.

At the beginning of the fourth year, the second course is taken up with the use of text books and while many of the same topics are considered in this course which were considered in the first course, the instruction given is in more advanced form. In this course we have these subjects: "The body." "Food, and its uses in the body." "Digestion." "Air, and its uses in the body." "Breathing." "Water, and its uses in the body." "Organs of excretion." "Blood and circulation." "The nervous system." "Care and protection of the body." "The voice." "Contagious diseases — their spread and prevention." And in this connection we have not forgotten to make war upon that detestable of all creatures, the common house-fly.

In the seventh and eighth years we have a third course still more advanced than either of the first two courses which I have just outlined, and upon the same general subjects. Of course in all this instruction there is a sufficient amount relating to alcoholic drinks and narcotics and their effects upon the human system to conform to the requirements of the law in these particulars.

But with adequate school buildings properly constructed and with the pupils in these schools under the instruction outlined, the work will not be successful unless the teachers have been trained to efficiency in the presentation of these particular topics. The instruction, therefore, given in physiology and hygiene in our State Normal Schools, in the city training schools and in training classes where teachers are prepared for rural schools, is based upon the outline of instruction which is to be given in this subject in the curriculum of the public school.

The elementary syllabus also contains an outline for instruction in what is known as "Household Science." Instruction in this subject is to be given to all children in the seventh and eighth grades who are in attendance upon the public schools. Some of these subjects relate to "Food and its preparation;" "The preparation and serving of meals;" "Home nursing," etc.; "First aid, treatment, and care of the sick;" "Cleansing agents;" "Household sanitation;" "Water supply;" "Necessity for cleanliness;" "Use of disinfectants," etc. Of course it is not possible, nor is it expected, that all of this work will be immediately begun in all the elementary schools of the State. Work of this character is being done now at Buffalo, in other cities of the State, and in some of the villages. This is a starting point. It will not of course all be accomplished in one, two, or perhaps five years. It must of necessity be a question of gradual growth and development. You can render a great service in the adoption and advancement of this work in the public schools of your several communities by assuming an interest in this subject and co-operating with your school authorities at home. By so doing you are putting into operation the ideas which have been frequently expressed here this morning and thus justify the existence of this admirable organization.

COMMISSIONER PORTER — I think we have all enjoyed the very pointed and eloquent address of the Commissioner of Education, and I know that we are all glad to hear that sanitation in public schools has taken its place and that we shall have a common-sense teaching of such matters, and that will train our children to be better men and better women in their public health.

Discussion on these papers will be opened by Dr. John L. Hazen, of Brockport.

DR. JOHN L. HAZEN, Brockport — The men who have spoken on these subjects have left little to say. However, I will say something as to the relation of the health officer to the schools in towns like my own where we we have not a visiting nurse nor a systematic inspection of schools. The only way we can get at the school is through the teacher and the public. The teachers of your schools will, if you ask them, refer to you any child that does not act right, who coughs or seems languid or stupid, and that is my only instruction to the teachers; and that report of the teacher gives us an entrance into that particular family for that child, and we can get track of what causes the trouble.

We hope at some time to have visiting nurses in all of our schools, and to have systematic inspection; but until that is done we shall have this half-way inspection, and the intelligent teachers are glad to co-operate.

In regard to teaching the public a more particular personal hygiene, I may say that I am in a town with a normal school and Mr. Finegan's plan is an excellent one. We are going to send to every country district a commissioner of prophylaxis; that is, a commissioner of personal hygiene, a highly trained person who will take the children and teach them along those lines in regard to contagious diseases and diseases of the nose and eyes,

and those things which in the past we have not been able to get at. Mental defectives will be classified early, and if they come from physical defects they will be remedied.

The schedule outlined by the commissioner will cover this whole field eventually, but we must get at these children with the co-operation of their family physician and their school teachers; and if we do, we shall soon be able to relieve many of these children who suffer physically and mentally.

DEPUTY COMMISSIONER HOWE, presiding — Is Dr. John L. Hughes, of Mt. Vernon, here? (No response.)

Then we will pass further discussion on this paper at this time and proceed with the second number on the program.

I want to impress one thought on the minds of the health officers and my other hearers, and that is this: That just in proportion as we possess good teeth are we apt to possess good health; and that in just the same proportion as we possess good health, so do we possess the resisting power to communicable disease.

It is a fact that the question of oral hygiene is rapidly assuming one of the most important positions in our sanitary work, and it is a pleasure to the State Department of Health and to the health officers of the State of New York to welcome to its conference a set of men who are doing a magnificent work in that particular field. We are certainly fortunate in having with us the speaker who will first address you, and it is with particular pleasure that I present Dr. William G. Ebersole, Doctor of Dental Surgery of Cleveland, Ohio, to speak to you on the subject of "Public Health and the Dental Profession."

PUBLIC HEALTH AND THE DENTAL PROFESSION

By WILLIAM G. EBERSOLE, M.D., D.D.S.
Cleveland, O.

Mr. Commissioner and Gentlemen of the Health Department of the State of New York, Ladies and Gentlemen: I wish to thank the Commissioner for the introduction he has given to the question I am to discuss.

Permit me to say that I feel highly honored indeed at being invited to come before the Annual Conference of Health Officers of the great State of New York. It is my belief that this is the first time in the history of medicine and dentistry that a dentist has been called upon to address the members of a State Department of Health, in even the smallest State in the Union, to say nothing of a great State like New York.

Therefore, I say to you that I consider it a great honor and a great privilege to be permitted to talk to you upon this occasion.

I fully understand that the courtesy which you have extended to me comes not because of the fact that I am a member of the medical profession, but because I am also a member of the dental profession; and because it was from the latter profession that you wished to hear.

I wish to say to you, gentlemen, that in recognizing the dental profession, you do honor and credit unto yourselves. You do honor unto yourselves by thus proving the broadness and progressiveness of your organization in recognizing the great need for dental service; and you do credit unto yourselves by being the first State organization composed of medical men to recognize and seek information upon the "Relationship of Public Health and the Dental Profession."

It is particularly fitting that the health officers of the great State of New York should be the first to extend a place upon their program to a dentist to be present and discuss with you this phase of sanitation and health; and, your so doing comes as a recognition and reward for the great amount of work which has been done within your State by the dental profession, with the ultimate end

in view of having your honorable body give full recognition to the importance which oral hygiene bears to general hygiene and sanitation.

To the Rochester Dental Society belongs the credit of having done more successful work in the oral hygiene field than any other city in the universe; and, my being here this morning to discuss this question before you is due more to the interest of the oral hygiene men of Rochester than to any other cause.

It is particularly gratifying to me to know that two of the greatest disciples of oral hygiene in your State are to follow me in the discussion of what I am to say to you.

By the way, gentlemen, I would call your attention to the fact that the names of the three dental men, who are to discuss this question this morning, begin with "William." Over in our town we have a habit of saying, "Let George Do It." I see by your program that over here in New York State you sometimes have "William" do it.

But to business, gentlemen; the time allotted to me is short and I do not wish to impose upon the courtesy extended to the dental profession.

The question of "Public Health and the Dental Profession" is one which for years I have considered of vital importance.

Years ago, as a law student, my health failed and I was led to give up my legal studies and was for a time employed to introduce to the dental and medical profession the then newly discovered local anesthetic "cocaine." My duties brought me in close touch with dentists and their patients, and the conditions which I found in the mouths of the laity at that time were simply appalling. I found that thousands of people were practically physical wrecks as a result of faulty oral conditions. Young and old alike were struggling through life with a fearful oral handicap.

So thoroughly impressed was I at that time that I became convinced that a man who would educate himself in such a way as to be able to educate the people to a point where they would realize the true value of healthy oral conditions, would fill a greater want than in any other profession. For twenty-three years, five years as a layman, five years as a student, and thirteen years as a member of the profession, I have been turning much of my time and my attention in that direction.

Within the past two years it has been demonstrated beyond any question, that 96 to 97 per cent. of the school children of this land are in need of actual care and treatment from a dental standpoint. In other words, gentlemen, 97 per cent. of the mouths of the school children of this country are in an insanitary and unhealthy condition.

What is the meaning of such a condition as this?

For years the health organizations throughout the country have been spending millions of dollars in their efforts to bring to the human family food stuffs and drink free from micro-organic life which would produce pathogenic conditions within the consumer. I repeat, millions have been spent for this purpose. Much good has been accomplished, to be sure. But, let me ask this body of intelligent and scientific men how much we have gained when we have brought this thoroughly sanitary and hygienic food stuff and drink to the consumer, at this tremendous cost, and then before it can reach the source for which it was intended, that is, the nourishing of mankind, it must pass through grinding machines, 97 per cent. of which are filled with pathogenic micro-organic life, there to have thoroughly mixed and incorporated with them the very class of germs which your valuable organizations have been fighting to destroy or eliminate from these necessities of life?

I again ask, how much have we gained? I am willing to concede that a great amount of good has been accomplished; but that which has been accomplished is so infinitesimally small as compared with that which might have been derived had a few of the millions which have been spent in keeping food stuffs free from pathogenic micro-organic life, been spent in giving to humanity, or in teaching humanity how to have, food grinding machinery which was healthy and free from pathogenic micro-organic life.

With 97 per cent. of the people with diseased or defective mouths, every one of which is a harbinger of pathogenic micro-organisms, I would ask if we have not overlooked and neglected in our search for sources of infection, the greatest producer, and at the same time the widest disseminator of pathogenic micro-organic life.

I need not tell this scientific body that in the one hundred and fifty and over, of micro-organisms which have been found to in-

habit the human mouth, many of those pathogenic organisms which you have been fighting for years, are constantly found. In addition to this, I wish to call your attention to the fact that the mouth not only contains, but breeds and disseminates pathogenic micro-organisms, which are to-day wielding a stronger detrimental influence to the human family than those which you have been so nobly fighting for all these years. I refer, gentlemen, to the streptococcus media, which produces caries, or decay of the teeth. Caries, or decay of the teeth, is the most prevalent disease known to modern civilization.

You are familiar, and thoroughly conversant with the manner and means whereby the organisms which produce typhoid fever, scarlet fever, diphtheria, pneumonia and tuberculosis, are transferred from one individual to another; and know only too well the tremendous havoc these organisms are capable of producing when unrestrained. But I want to say to you, gentlemen, that the micro-organisms which produce caries, or decay of the teeth, are just as readily transferable from child to child and from adult to adult as the other organisms just mentioned; and, are wielding a far greater havoc in the human family than all the others put together.

I am well aware, gentlemen, that the words just uttered will lead some of you to say that the speaker is either crazy or a fool to make such statements, but I can assure you that neither is the case.

When you have given as much thought, time and consideration to the study of this question as the speaker has given, you will then begin to realize something of the tremendous influence for evil these "tooth-destroying" micro-organisms are wielding in the human family.

In support of my statement, let me quote from Prof. Osler, a man from your own ranks, who was sufficiently well posted in this direction to make the following statement before a body of dentists and dental students a couple of years ago. He says:

"You have one gospel to preach, and you have to preach it early and late, in season and out of season. It is the gospel of cleanliness of the mouth, cleanliness of the teeth, cleanliness of the throat. These three things must be your text throughout life.

Oral hygiene, the hygiene of the mouth — there is not one single thing more important to the public in the whole range of hygiene than that."

It is but reasonable then that a dental man should make such a statement as I have made when there has been enough in this question to merit Dr. Osler's statement.

Let us consider for a moment. We have told you that 97 per cent. and over of the mouths of the people of this country are diseased; and, that in every one of those 97 per cent. the "tooth-destroying" micro-organisms are found. And, in every mouth where the "tooth-destroying micro-organisms are found, we have a pathogenic condition, and in every mouth where these organisms are permitted to become active, the best possible breeding places are found for the pathogenic micro-organisms with which you gentlemen are so familiar.

Not only do the "tooth-destroying" micro-organisms aid in producing breeding ground for other pathogenic micro-organisms, but they, by their action, produce two of the most favorable conditions for possible infection.

First, by their activities around the necks of the teeth they produce softened and bleeding gums, which offer an excellent opportunity for infection. But, worst of all, by their inroads into the tooth substance, they destroy the dental tissue until the dental pulp is exposed, producing the best and probably the most frequent means of infection which takes place in the mouth.

A tooth with an exposed pulp, or more particularly one with a dead pulp; the cavity or pulp chamber of which is filled with pathogenic micro-organisms, becomes the best possible means for infection, because in the chewing of the food, the pulp chamber acts in the capacity of the barrel of a syringe, and the food stuffs forced into the same act as a piston, thus forcing the contents into the soft tissue at the apex of the tooth.

The percentage of infection which takes place from this means, no man can estimate. But when we consider that of the enormous

number of mouths that have dental lesions at least 50 per cent. of them show teeth which contain exposed or putrescent pulp, we may be able to explain many of the heretofore "not understood" sources of infection.

During the past year, it has been my privilege three times to occupy and speak from the same platform with that gifted and tremendous force in the sanitary world, Dr. W. A. Evans, Commissioner of Health of Chicago. The last time we were together he spoke on the subject of "The Dentist and the Public Health," a subject almost identical to that assigned to me this morning.

Dr. Evans has given considerable thought and attention, during the past two years, to this phase of sanitation and hygiene; and has been working hand in hand with many of the leading members of the dental profession in his city, and I therefore desire to quote some of the statements he made upon the occasion above referred to. He says:

"In the first place, the mouth is regarded now more and more as of relation to contagious diseases. About a month ago I was at the meeting of the American Public Health Association held in Milwaukee, and great stress was there put on the relation of the secretions of the mouth, of the cavities accessory to the mouth, to scarlet fever, to diphtheria, and to measles, to which with perfect propriety can be added consumption, pneumonia, and common colds. In times past in considering the care of the person who has had scarlet fever we paid great attention to the skin. It is but recently that we have come to understand that the skin was of minor importance in spreading scarlet fever, if it was of any importance at all, and after cases had been held for the customary six weeks or thereabouts in the hospital, had been held until all scaling of the skin had ceased, and then had been returned to their homes, had been returned to the family circle in which there were children susceptible to scarlet fever, that a certain percentage of cases would occur as a result of those contacts. Later we came to understand that the child supposed to be clear of contagion, in reality was spreading contagion or carrying contagion back into that home, and then we came to know that the means by which contagion was carried was the secretion

of the mouth and the accessory cavities of the ear, the nose, the naso-pharynx, that contagion was held in the crypts of the tonsils, in recesses in the mucous membrane, in the naso-pharynx, in the secretions of the ear, and then we came to know the possibilities around the teeth that had not been properly cleaned and in cavities that were filled with organic matter of various characters, that there might be elements of contagion; and what is true of scarlet fever is probably still more true of diphtheria. That the baccili capable of infection lurk in the crypts of the tonsils, in the mucous membranes, around the roots of teeth, around the gum borders of teeth, in cavities in teeth; and after these things we have been watching have been proven to be clear and we have allowed the children to go among the other children of the family, that contagion is carried to them through these means of carrying hitherto overlooked. Probably of greater consequence still is the possibility of the spread of contagion in the cases of pneumonia, common colds and consumption. The dental profession, the work of the dental profession, teeth cared for and teeth uncared for, is, therefore, a matter of great concern in the prevention of the spread of a contagious disease."

When a man of Dr. Evans' caliber, who has given less than two years' thought and study to the influence the mouth may wield in the transmission of contagious diseases, has been sufficiently impressed to call forth the statements which I have just read in your hearing, I would ask what must be the impression upon the mind of one who has given years of thought and study in this particular direction; and, in the light of one who has so studied and investigated, I wish to repeat that the micro-organisms which produce caries, or decay of the teeth, are just as readily transferable, patient to patient, as any other micro organisms, and are wielding far greater havoc than all the others put together.

Thus far I have spoken of the mouth and the influence it wields for good or for evil from the hygienic standpoint.

In the medical profession, we have specialists who devote their time and attention to every other part of the body, save the mouth. The medical men have sidestepped here and left the mouth to the dental men. The medical men have considered the dental men

the oral specialists and the dental men, almost to a man, have until recently failed to grasp the full responsibility which rested upon their shoulders and realize that upon them rested the importance of proper oral conditions.

Most dental men have been tooth specialists instead of oral or mouth specialists. It is only when the dentist realizes his responsibility in the latter capacity that he assumes his true relation to the public health in his community.

With oral conditions as we find them, and with the influences they exert upon the public health and general welfare of the human family fully recognized and the dental profession alone occupying the field of oral specialist, it is to this profession that we must turn for the correction of the faulty conditions which here exist. To him belongs the mission of teaching prevention, and practicing correction of dental lesions. In teaching prevention he must do so from two standpoints: First, he must teach that a clean tooth never decays, and must therefore instruct his patients in the performance of a correct sanitary dental toilet. He must also teach that "a lazy tooth becomes in time a rotten one." He must therefore teach when and how to properly use the teeth that they may not only perform their full duty as related to the general digestive tract; but, that they may in turn, by their proper activity aid in their own self-preservation.

And, last and least, it is his, when the dental lesions occur, to correct or repair the same.

Too often with the dentist of the past the last has been first and the first has been last; but, to-day, thanks to the activity of the few, the many are awakening to the importance of, and giving full thought and consideration to, prevention, while correction and repair is assuming its proper position in the scale of importance, that is, that of being secondary to prevention.

To the dentist then belongs the mission of teaching how, and aiding in keeping the mouth in the condition and for the purpose for which the Creator intended it.

With the dentist responsible for the condition and use of the mouth, it becomes necessary, in order to establish the true relation of the dentist to the public health of the community, to show what influence the mouth bears in that capacity.

I know of no illustration of what an important part the mouth plays in the health of the individual, than that which has been shown by the activities and research work done by Mr. Horace Fletcher. This man, who at the age of forty was a physical wreck, being on the scrap heap, as he called it, denied insurance by the insurance corporations; and condemned to an early death by the examining physicians, has, by the proper use and care of the oral cavity, produced from a physical wreck at the age of forty, a man who at the age of sixty is able to practically double the greatest feats of strength and endurance performed by the best athletes of the leading colleges of the world.

Not satisfied with the experience of one individual, the speaker, in the name of the Oral Hygiene Committee of the National Dental Association, has undertaken to prove the actual value of the proper use and care of the mouth upon the working efficiency of forty children, selected from Marion School, Cleveland, Ohio, as having the worst oral conditions out of an enrollment of 886 pupils.

In selecting these children a complete and careful examination of the mouths were made and the history and class records of the children taken for six months preceding the time treatment was begun. Two psychological tests were made to prove the actual working efficiency of the children at the time they were received for care and treatment. They were then placed under the instruction and care of a nurse to teach them how to use and care for their mouths; and dental service was furnished to correct all faulty oral conditions. The majority of these children were repeaters, and some of them were only kept in school by the truant officer. Special meals were served to teach the children how to properly use their teeth.

It is yet too early to state just what results will be shown by the experiment conducted with this class, owing to the fact that we are just in the midst of our work and our records will not be completed until after the first of June, 1911. But, we have progressed sufficiently far to be able to say to you that the most marked improvement has been shown.

The work with this class was begun the first of June, 1910, and from that time down to the present, there has not been a single case of illness of any member of the class, and the school records in scholarship, effort, attendance, and conduct, show wonderful improvement. So much so indeed, that not only the principal of the school, but, every one who has had any opportunity to know and be familiar with the class, speaks in the most glowing terms of the results which have been accomplished.

The work has progressed far enough, gentlemen, for me to make the statement that when the final results are compiled, they will be of sufficient importance to command and hold the attention of every man who is interested in the general welfare of humanity.

The importance the mouth then bears, gentlemen, to the general physical condition of mankind, entitled it and those who are devoting their lives to its needs, to full recognition and consideration by those organizations, municipal, State and National, which have to do with the physical welfare of the human family. Every organization which has health for its consideration, should have not only in its council, but in its inspection department as well, members of the dental profession. And, just as sure and as certain as I stand before you this morning, those organizations which are the most progressive and successful in the handling of public health questions, will have the dental profession well represented in every active department. Think not that there is no need for dental representation in connection with health boards or bureaus; and think not that the medical men can successfully handle this important phase of hygiene and sanitation, for such is not the case. Conditions are so appalling, and the dental lesions so distressing, and the physical condition so impaired by faulty oral conditions

that only dental activities of the most foreeful kind can wield sufficient weight and influence to produce a psychological impression which will in a measure lead to a full understanding by the individual of the obligation and duties he must perform if conditions are to be met and corrected.

The people must be taught to know and do those things which will produce and maintain perfectly healthy oral conditions; and to the dental profession alone belongs this duty and this obligation, and they must fulfill them if humanity is to come into its own.

I recommend, therefore, to you, gentlemen, that members of the dental profession, not only be invited to work with you; but, that they be given appointments and recognition in connection with your various departments of public health and inspection if you would do the greatest good to the greatest number. For, to the health organization which first takes this step, will be given the credit of being first to read the "signs of the times" and recognize the importance of a great reform movement which is sweeping throughout the world.

Believing that the Health Officers of the great State of New York here assembled will not only see the importance of such a movement, but will pass a resolution recommending such action, I close.

I thank you.

DEPUTY COMMISSIONER HOWE — We will now take up the discussion of this paper by Dr. Ebersole. I will first call on Dr. White, an ex-president of the State Dental Society, who has been active in prosecuting this work, to say something to us on this point. It is with pleasure that I call on Dr. White.

W. A. WHITE, D.D.S., Phelps — *Mr. President, Ladies and Gentlemen:* This is certainly a new paper for the consideration of a body of this kind, and it is a golden opportunity for a dentist to be able to stand before such a representative body of the medical profession. You have listened to an able presentation of the relation of the public health and the dental profession. My remarks in discussing this paper will be very short, and will be devoted more to a consideration of the child and its mother.

Dr. Netter, a physician, through microscopical research has revealed the astounding fact that the diplococci of pneumonia and the bacillus of typhoid and diphtheria, as well as the micro-organisms of erysipelas, anthrax and

thrush exist in the mouths of fifteen per cent. of that class of bodies which are ordinarily classified as healthy. If these, then, exist in the mouths of those known as healthy subjects, what must we expect to find in the mouths of those subjects who use no tooth brush or dentifrice or prophylaxis?

Recall the cases where a child is constantly using up energy and the tissues which enter into the formation of the structure of the child's body. What must be done? What can be accomplished? And how shall we restore the tissues carried off in this form of activity by the child? The builder in constructing his building seeks out good material, and various kinds of material, to compose his structure. He selects for its base or foundation, stone, brick or other suitable material. And so on throughout the building. So the child must have the various elements which enter into the various parts of its structures and tissues of its body incorporated there. If the builder places poor material in one part of his building, he has a weakened structure. And so it is with the child, unless proper assimilation takes place, there is a weakness, and in order to produce proper structure, we must have thorough assimilation of the food, and thorough assimilation of the food requires thorough digestion; and in order to have thorough digestion, we must have good teeth, and thorough mastication of the food in the mouth.

Prof. Michael, of Germany, says that mastication consists of two different acts. First, the canine teeth, tear pieces of the food and cut it up, and second, the food in turn must be ground, ground and ground by the molars, until, with proper insalivation by uncontaminated saliva, the food is carried into the stomach. Under such conditions we have thorough assimilation, which we cannot have without thorough mastication and digestion.

Now, when we take into consideration the fact that ninety-seven per cent. of the school children are in need of dental attention, with seventy-five per cent. of this number unable to have such attention, I ask this body of medical men, is there any greater avenue through which our efforts may be directed, which will yield greater results for the physical betterment of mankind, than by instructing the children in our schools the manifold blessings resulting from a thorough knowledge of, and how best to exercise, this knowledge?

It cannot be truly said by physicians that the condition of the mouth and the absence of teeth have no bearing on the development or the nourishment of the child or other individual, neither can it be maintained that an individual can live just as well and with the same amount of vitality without insalivation of the food. It is evident, therefore, that insalivation must take place before we can realize a normal digestion and have our food valuable. Thoroughly masticated white bread; twenty-four per cent. of it is converted into soluble sugar in one minute, and thirty-nine per cent. of it in five minutes. Then, as this food passes into the stomach, the saliva-ferments are active for from ten to twenty-four minutes in the stomach, until they are neutralized by stomach acids. This proves the great importance of insalivation, especially in starch food. And on this point we must remember that the eye specialists admit that decayed teeth cause indigestion, and indigestion causes eye-strain.

How many of you gentlemen have seen a child sent to school with a sore face and an aching tooth, wholly unfit to accomplish the work set before it? The swelling soon passes off, and the mother and the child assume that the trouble has all passed away; but you gentlemen, and particularly those of the dental profession, know that the trouble has not gone, but an abscess is forming in the tooth. A fistula develops and the discharge vitiates the saliva of the mouth, and contaminates the food entering the stomach, and there the trouble begins. The assimilation which should take place there is interfered with by the unhealthy condition of the food lying in the child's stomach.

These things can be overcome only by a thorough knowledge of oral hygiene, and I believe no greater favor can be granted, or extended to the mothers and the children than for the Department of Health of the great State of New York to have in connection with its work, a Bureau of Oral Hygiene. and then every mother will bestow a blessing on the State Department of Health, and by so doing it will withstand the ravages of storm, time and temper.

Now, in regard to this instruction of the mothers, I can do no better than to read to you the words of Daniel Webster, who said, when he addressed an assemblage of ladies:

"It is by the promulgation of sound morals in the community, and more essentially by the training and instruction of the young, that woman performs her part toward the preservation of a free government. It is generally admitted that public liberty and the perpetuity of a free constitution rest on the virtue and intelligence of the community which enjoys it. How is that virtue to be inspired, and how is that intelligence to be communicated? Bonaparte once asked Mme. de Stael in what manner he could best promote the happiness of France. Her reply was full of political wisdom. She said, 'Instruct the mothers of the French people.' Mothers are, indeed, the affectionate and effective teachers of the human race. The mother begins her process of training with the infant in her arms. It is she who directs, so to speak, its first mental and spiritual pulsations. She conducts it along the impressible years of childhood and youth, and hopes to deliver it to the stern conflicts and tumultuous scenes of life, armed by those good principles which her child received from maternal care and love.

"If we draw within the circle of our contemplation the mothers of a civilized nation, what do we see? We behold so many artificers working, not on frail and perishable matter, but on the immortal mind, molding and fashioning beings who are to exist forever. We applaud the artist whose skill and genius present the mimic man upon the canvas; we admire and celebrate the sculptor who works out that same image in enduring marble; but how insignificant are these achievements, though the highest and fairest in all the departments of art, in comparison with the great vocation of human mothers. They work, not upon the canvas that shall perish, or the marble that shall crumble into dust, but upon mind, upon spirit, which is to last forever, and which is to bear, for good or evil, throughout its duration, the impress of a mother's plastic hand."

I believe that the future holds great possibilities for the dental profession, that its duty of preserving and promoting the public health will make it one of the greatest public forces, if we but use our best effort to encourage and foster the teachings which we advocate. The influence of such work cannot die, but will go on and on for years to come, as a rich inheritance for those who follow.

I thank you for the opportunity you have given me in the name of the National Dental Convention and Dental Society of the State of New York, for this recognition which you have extended to myself and to the other gentlemen of the dental profession who are here.

Deputy Commissioner Howe — This is a new branch which is coming to stay — the question of the care of the teeth. I want Dr. Belcher, of Rochester, to speak to you a few moments in discussing this paper.

W. W. Belcher, D.D.S., Rochester — A clean mouth is a safeguard against disease. A clean mouth turneth away trouble is just as good a proverb as "a soft answer turneth away wrath."

The full significance of these facts have not been understood by even the dental profession until a comparatively recent time. Dentists have been practicing preventive medicine but knew it not.

Not unlike many other great truths, the wonder is that we should not have recognized it earlier.

How delightfully simple. At least 75 per cent. of all our diseases are introduced through the mouth. If this be true, what scrupulous care should be taken to keep it clean and free from contagion.

As a matter of fact, how little care has been exercised by even the average reasonably neat person; they have given more attention to the cleanliness of their feet than this vestibule of life, the human mouth!

That a dirty mouth with its wealth of micro-organisms should spread disease and cause numberless ills seems quite simple; that such diseases as diphtheria, croup, and all respiratory troubles should be very much worse and many times caused by an unhygienic mouth seems equally true. That a child doubling his weight and at the school age assuming the added burden of his mental development needs a good chewing equipment, and that it is absolutely essential to his future welfare seems, in the light of to-day, an undebatable truth. Why didn't we recognize this fact earlier?

A tuberculosis patient must have a good dental equipment if he is to make a successful fight against the "Great White Plague," and cannot recover if he be burdened with a filthy mouth harboring infection and uncleanliness, with the possibilities of constant reinfection to the human economy and the accompanying digestive troubles associated with this condition; and yet we have, in the past, practically neglected this important help. That the percentage of cures have been so low is not surprising, as that there should have been any at all.

How could we ever have expected a child with twelve to fifteen of its twenty teeth decayed, with exposed pulps, with teeth discharging their dirty slimy pus into the stomach and mixed with every mouthful of food, impairing the digestive fluids and burdening the body with poisonous toxines to keep up its studies at school or remain in good health.

Children in the past have survived these conditions; have lived in filth, and, in spite of these handicaps, have attained to their mental and physical equipment; how did they ever do it? God only knows. How many of these children have been whipped and misunderstood at home, apologized for at school with a reputation for a bad temper for being obstinate and dull when the whole trouble was that they had to fight a diseased condition produced by a deficient and uncared for dental equipment with the poisoned and contaminated and poorly chewed food that refused to build healthy tissue and brain matter.

Can you wonder at this child with a diseased mouth and all its associated troubles, with adenoids, unable to keep his place in school, shunned by his companions and no place in their childish sports, becoming discouraged? He is told that he is not "bright," he loses faith in himself and looks with envy on those more favored. He plays "hookey" and finds congenial companions outside his school life and ofttimes becomes a physical and moral degenerate.

Now we cannot escape this responsibility. The child of to-day is to be the ruler of to-morrow; the lawmaker and the governor of our large cities and the nation. The law of the statute book is the law made by public opinion, and public opinion is being largely shaped by men and women of improper mental and physical development; by men from children grown who did not have a square deal in our schools and who labored under a physical and mental handicap: they were never "free and equal" and this is part of the cost that every community is paying for poorly developed children.

Do you think this picture has been overdrawn? How many children whom you know have entered school full of promise and from some unknown cause have solely drifted from bad to worse — lost their place and degenerated physically and mentally?

Dr. Gulick, after some time investigating this matter, says that two defective teeth in the mouth of a child will retard him for half a year in his studies.

What are we doing for these children in this land of ours? Why, practically nothing. We have plenty of money to fight doodle bugs, foot and mouth disease among our cattle and infectious diseases among our hogs and money for forest preserves and a Barge canal. Don't you think it would be economy to spend a little of this money on our greatest national asset, the boys and girls of to-day who are so soon to be our rulers and lawmakers? How long, Oh Lord, how long shall the blind lead the blind?

These statements as here presented you may or may not believe, but truth is strong and must prevail. Dentistry has a most important place in the practice of preventive medicine. You must accept this. Any other attitude in this year of our Lord is harking back to the Voodo doctor and the dark ages. Let in light!

DEPUTY COMMISSIONER HOWE — We will now take a recess until 3 o'clock, and we will ask you all to be prompt in returning so that we may resume our program where we left off and complete the balance of the forenoon program, as well as the afternoon program, during the afternoon session.

Recess until 3 P. M.

WEDNESDAY, NOVEMBER 16, 3 P. M.

SECOND SESSION

DR. HILLS COLE, Temporary Chairman — I am not the proper presiding officer at this function, but as head of the bureau of publicity, which is responsible for getting up the program, I feel that it is my duty to see that the program is carried through, and inasmuch as no executive officer is present I will take the liberty of calling the Conference to order.

We will first take up that part of the program which had to be omitted this morning and we will have a discussion on the topic of public health work and public health officials and the medical profession. We shall treat that from the standpoint of the health officer as he experiences difficulties among his brethren in the medical profession, and then we shall have it treated from the standpoint of the general practitioner and his trouble with the health officer, and I hope out of the discussion we shall have much mutual profit.

We shall now have the pleasure of listening to Dr. Lake of Gowanda, medical officer of the State Department of Health, who will speak to us on the "Difficulties of Health Officers as Seen by the Physician."

DR. A. D. LAKE — Mr. Chairman, Ladies and Gentlemen — The forenoon session has been to me, as I know it has been to all of you, an exceedingly interesting one; and we have had for topics matters not pertaining to ourselves but to others. We now come to that part of the program in which we are permitted, to a certain extent, to speak of ourselves and our medical associates and that is the substance of my paper.

THE DIFFICULTIES OF HEALTH OFFICERS AS SEEN BY THE PHYSICIAN

By A. D. LAKE, M.D.

Medical Officer, State Department of Health, Gowanda, N. Y.

In discussing the various functions of the health officer, it is apparent that in the largest measure, the attainment of the best results, in his official capacity, must depend upon the cordial relations existing between him and all the physicians with whom he must come in contact in the fulfillment of his duties to the public. To secure to the people the protection, which the creation of his office was expected to bring about, he must have the co-operation of all the physicians in his jurisdiction.

It then becomes a question of the greatest importance, how such relations are to be secured and maintained. It is a fair inference that the first qualification, both in education and ethics, demanded by the physician of the health officer, is that he should measure

up, in attainment, to the high standard now existing in the profession of medicine. It is expected that he should seek to continually inform himself along the special lines of work called for by the duties of his position.

In the vast field of sanitary science and preventive medicine, in which such rapid advancement has been made in recent years, the physician looks for the health officer to stand in the fore-front, an earnest, industrious student, a careful investigator, a tactful administrator, always mindful that he does not exceed his lawful authority. To reach this point of excellence is not an easy task, nor, in most instances does it bring much of other reward than the consciousness of well-doing. If, however, he fails in these requirements, demonstrating his ignorance of the things he ought to know, the result is surely unfortunate, and possibly disastrous.

Within the reach of the health officer is the most extensive literature, largely of a character particularly demanded by the character of his work. There is also the school of sanitary science and the annual conference, both maintained by the State Department of Health. It is reasonable to suppose that both physicians and the public expect health officers to avail themselves of these opportunities of obtaining information.

The sphere of knowledge in sanitary matters being more largely in the province of the health officer, the physician may consistently look to him for information and instruction. Here, however, the official should not err in an attempt to demonstrate his acquirements in an intrusive or offensive manner, or under circumstances where such information is not demanded. It would not be at all difficult to find a place on the program, at every meeting of the various medical societies, which should be filled by a paper from some health officer, containing practical ideas and suggestions, the result of his special work and study. The development of this plan would be likely to bring us more in touch with the profession in general, and might go far in obtaining more complete returns of vital statistics and reports of the existence of infectious diseases.

The State medical societies as well as those of the several counties have standing committees on public health. It would seem very proper indeed that health officers should largely interest

themselves in the work of these committees, and be prepared, whenever invited to do so, to assist in their beneficial efforts.

Assuming that the health officer is in possession of the necessary educational requirements, we may ask what are the relations which should exist between him and the attending physician in the presence of infectious and communicable disease? It is realized that in some instances this may become quite a delicate question. The case must be reported to the health officer, and it at once becomes his duty to put in operation measures to protect the public from further infection. To do this effectually he must visit and inspect the premises, instruct the family as to the means necessary to confine the disease to the individual cases reported, and establish a quarantine. To accomplish all this it may or may not be necessary for him to see the patient. In either instance it would seem best, if possible, that he should first seek an opportunity to interview the attending physician, obtaining from him such information regarding the history of the case reported as he may be able to supply. It will be found, very often, that the latter himself has investigated as to cause and origin, and will be glad to communicate the result of his research, if asked to do so. If the inspection can be made in the presence of the attending physician it should be in aid to the health officer in gaining the confidence of the family, and, in many instances, bring to his continued support the help of the physician. In this connection it should be maintained that the health officer is not a consultant, by virtue of his office, and he should never assume to act as such unless requested to do so by the attending physician.

In his inspection it is most important that his demeanor and his language be circumspect, carefully guarding the interests of the physician, and never intruding suggestions as to treatment. If a question as to the accuracy of diagnosis should arise, the views of the health officer should first be presented to the physician, and not in the presence of others. When the matter has been decided, if the diagnosis is to be changed it would be wise that the announcement be made to the family by the attending physician rather than by the health officer. In the opinion of the writer, after many years' experience as health officer, such matters can be amicably settled, with the best results to all concerned,

nothing being necessary to bring this about except that the health officer avoid the temptation, which the occasion may afford, to gain the reputation of being a better diagnostician than the attending physician.

A most unfortunate condition arises when infectious diseases are not reported by the physician, with a case coming to the knowledge of the health officer through other sources of information. In most of such instances it is to be assumed that the neglect is due to carelessness or forgetfulness rather than from any intent to evade the law. Taking this view it will not be difficult for the health officer in a tactful interview with the physician to so arrange matters that pleasant relations may still be maintained between them.

The health officer comes to his duties armed with somewhat arbitrary power. This authority should never be manifested except in the rarest instances, either toward the physician or the public. The best results here, as elsewhere, will always follow the exhibition of tact, diplomacy and kindness.

A matter of considerable importance, affecting the interests of both physician and health officer, is the question of compensation which the latter should receive for his services. All must agree that the amount generally paid is entirely inadequate, and not at all commensurate with the work required. Each year the responsibility and the labor of the office is increasing, and it is not easy to explain why municipalities should not properly compensate these officials for the performance of their multitudinous duties. Doubtless this will be done when physicians demand it, and when they discourage any attempt to secure such services except on a fair basis, as compared with work in private practice. It would seem eminently proper that no competition should ever exist, either between physicians or health officers, as to fees of this character.

The physicians may rightfully expect the health officer to be alert and ready for action, whenever his services are required. Under present regulations he is to look to him for certain supplies, very necessary in the proper management of some of his cases. It is therefore important that the health officer always have at hand vaccine virus, antitoxines, culture tubes, the solution

for prophylaxis in ophthalmia neonatorum, disinfectants, sputum cups, etc. He should be ready, at all times, to forward water to the proper places for analysis. He is justly subject to criticism if he neglects these important duties, and fails to respond promptly to the call of the physician. On the other hand if his official acts are characterized by honesty of purpose, enthusiasm in his work, and a sincere interest in the public welfare, there is little doubt he will gain the respect and support of his professional associates, and the laity as well.

COMMISSIONER PORTER — The other side of this discussion will now be presented by Dr. Alsever, the medical officer of the State Department of Health at Syracuse.

PUBLIC HEALTH AND THE MEDICAL PROFESSION — THE SPIRIT OF MUTUAL HELPFULNESS

By Wm. D. Alsever, M.D.
Medical Officer, State Department of Health, Syracuse

If each one lived according to the golden rule, a discussion of "The Spirit of Mutual Helpfulness" would be uncalled for. But such lives are not lived, for each of us is human and has human vices. In the stress of life each of us is strongly tempted to gain advantage by the use of unfair methods. None of us always resist this temptation, most of us usually resist it, while a few of us succumb frequently. That is to say, most men are honest, only a minority are dishonest.

In sanitary matters we must remember that we are dealing with both the honest and the dishonest, and that our object is not primarily the improvement of the morals of the people nor the prosecution of law breakers, but the improvement of the public health.

In considering how health officers and doctors can better work together to accomplish that result, we must, I believe, keep two facts constantly in mind — first, that we are dealing with all kinds of men, and, second, that it is results we are after.

I am indebted to about fifty of my friends, living in various parts of the State, for frank expressions of their opinions on this subject, and what I say is based in part on their statements.

I have endeavored to find out whether the average health officer and the average doctor are honestly desirous of promoting the public health. The majority of those who expressed an opinion on this subject agree with me that these men, as a rule, wish to promote the public health. That health officers are ardent in their duties is very gratifying for usually they are underpaid, they hold office subject to the wish of politicians, and they work with the knowledge that progressive or unusual methods will certainly antagonize a considerable part of the community on whose good-will they must depend to earn a livelihood at the practice of medicine. I believe it is a fact that health officers have the

health of their communities at heart and are but rarely the medical castoffs who are unable to make a living in the profession and seek office for the salary only.

The aid given by practicing physicians to all public health matters is evidence that they have such matters at heart. The prevention of disease must necessarily be bad for the business of the doctors. The establishment and enforcement of quarantine with its accompaniments of great inconvenience and expense to families is a burden which the doctor, for business reasons, is tempted not to undertake; and this temptation is greatest if the sickness is either mild or atypical. The removal of patients to hospitals if they are thereby lost to the attending doctor may naturally enough be against his wishes, especially if he is young and needs the business. Evidently a mercenary practitioner has very little reason to actively promote public health. The part which has been taken in sanitary matters by the doctors of New York State, both individually and through organizations, is convincing proof of their unselfishness.

After all, why should either general practitioners or health officers, who are but temporarily drafted from the profession, have a monopoly on sincere support of the Department of Public Health. They have been educated in the same schools and have practiced in the same communities and must, in the aggregate, have similar ideals. I regret to say that the contrary opinion has been expressed, but I believe a study of the facts proves my conclusion. It is inconceivable that health officers and general practitioners can work together for the public health unless each freely acknowledges the fundamental honesty and sincerity of the other. That either could work successfully without the cordial support, or with the avowed opposition of the other, is evidently impossible.

Health officers have a considerable amount of power and may through process of law attempt the enforcement of quarantine, for example, but if this should be the only method used and the disease were at all prevalent, the community would become antagonistic, quarantine would become impossible and the disease would be uncontrolled. A supporting public sentiment is essential to an effectual quarantine. Without it all methods fail us

and we do not get results. Examples of this fact are common among our ignorant and foreign speaking communities. The greatest moulder of public sentiment on health matters is the family doctor. The State Department of Health is accomplishing much, but if its efforts were met by the outspoken opposition of the family doctor they would not be very fruitful. The interdependence of health officials and general practitioners is quite evident. There must be "mutual helpfulness" in order to get results.

There are two ways by which health officers may attempt to secure the co-operation of practicing physicians. One is by the strict enforcement of law through the police and the courts. The other is by tactful and intelligent moulding of opinions so that doctors will want to co-operate. Many doctors are now actively and willingly co-operating with the health authorities. The great majority of doctors can be induced to do so. There is a small minority of doctors who are actively antagonistic, some because of disbelief in or ignorance of modern sanitary methods, some because of fancied or real grievances against health officers, and some because of selfish and mercenary motives. There is no doubt that doctors frequently break the Public Health Law either wilfully or through ignorance. If the first method of dealing with them is followed and they are convicted and sentenced for violation of law, they will be less likely to do things which will lead to further arrests, but the Department will have made some bitter enemies. By influencing their friends and patients against sanitary measures these men will usually put more difficulties in the way of the Department than they did before their arrest made them angry and revengeful. Americans are intense in their love of personal liberty, probably too much so, and the application of force without an appeal to reason is likely to result in a less effectual enforcement of law. One of our foremost citizens has recently explained the difference between a boss and a leader — the leader leads and the boss drives. I submit to you that doctors are easily led, but driven with extreme difficulty. Health officers should studiously avoid being forced into the position of "drivers" of general practitioners — they should rather acquire for themselves positions as "leaders." I believe that arrest or

the threat of arrest of doctors for violations of the Public Health Law will, except in isolated instances, do more harm than good, notwithstanding however salutary the immediate effects may appear. I do not believe that any considerable number of practicing physicians will violate a law if they understand it.

Having thus called attention to the cordial support given to sanitary measures by both health officers and general practitioners, and to the general inadvisability of enforcing obedience through the courts, it is proper for us to consider how the mutual helpfulness of these men can be increased.

The principal difficulty is that doctors and health officers do not fully understand each other. The ignorance of general practitioners on the letter of the law, the reasons for the law and the results which are hoped to be obtained, is astounding. Of course, they should know these things and ignorance is not a legal defense for a violation of the law. However, prosecuting a man because of ignorance is not a good way to get his co-operation in matters of public health. Many times an interview between the health officer and an offending doctor would result in showing the doctor his mistake and establishing such good feeling that the doctor would become entirely cordial in his support of the Department. If doctors were familiar with the reasons for and the expected results from the various health regulations, in most cases they would not forget to do their part nor would they do it unwillingly. This seems to be largely a question of education. Unfortunately our medical schools have never properly trained their pupils in public health matters. The average graduate knows too little about the practical details of the preservation of the public health, and he appreciates too little his own responsibility to the State. Much of this would be corrected if the State examination in hygiene was made more stringent. An interne on being questioned recently regarding the possible sources of infection in some typhoid cases replied that he had not looked into it, for that was the business of the Board of Health.

The *Monthly Bulletin* of the State Department of Health has done much to educate us. Its articles are so ably written and the conclusions so reasonable that a reader becomes more enthusiastic in his support of the work of the Department. Unfortunately,

the *Bulletin* does not reach everyone nor does everyone who receives it read it. However, its influence extends through its readers to the entire community. It is difficult to appeal directly to the doctors who are more or less indifferent and to the people in general. Evidently it is nearly as important to educate the people as to educate the doctors, for, when the people demand better sanitary measures, doctors hasten to supply that demand. Therefore, to obtain the greatest degree of mutual helpfulness we must teach the people of the State about sanitation.

One of my correspondents expressed the idea well by saying: "I think the greatest trouble in the past with local health departments and with the State at times, has been the lack of advertising. I mean of showing the local men what the Department is trying to do to help them, showing them that the Department hasn't got horns and is not trying to steal their cases, but is working with them as consultants and giving advice gathered from a wide field by the State." Various methods of advertising might be employed. At all meetings of local medical societies, the health officer or some representative of his department could report on sanitary conditions, laying especial emphasis on the difficulties with which he has had to contend since the previous meeting and the methods used to overcome them. The discussion following this talk might sometimes be helpful to the health officer, but surely the practitioners would get information which would make them less likely to hamper ignorantly the work of the Department. Both health officers and practitioners have made many complaints against each other, but I am firmly convinced that in most cases the disagreement is due to ignorance or to their failure to discuss their misunderstanding. A committee was once appointed to codify the rules for quarantine in scarlet fever, there having been so many instances of doctors advising their patients to do certain things which were later prohibited or criticised by the health officials that considerable antagonism had developed. It was proposed to put in the code a rule which all agreed was suitable, but which one, an ex-health official, objected to as unnecessary, saying everyone ought to know it, and that if anyone violated it, the health officers should "get the law after him." The objector was then reminded that the object of the committee's

work was to anticipate and prevent differences and that it was hoped that it would be unnecessary to "get the law" after any one. If a health officer should form a cabinet composed of leading doctors he might sometimes get helpful advice, but he surely, through unifying their ideas on sanitary problems and stimulating their interest, could develop a force of almost unlimited power in moulding public opinion. I have spoken of the possibility of a health officer getting help from his medical society or his cabinet, for, I believe it should be only a possibility, and that a health officer should be so equipped by education or by experience or by both that he will be looked upon as the local authority and the natural consultant in sanitary problems. The State Department offers some valuable courses and there are few doctors who would not be benefited by further training in practical bacteriology. The least a health officer can do is to attend the Sanitary Conferences. If a health officer is to be recognized as the local consultant he must adhere to the rules of professional etiquette, otherwise he will not be given the opportunity to help in the diagnosis and prescribe the treatment of doubtful cases.

Another method of advertising which is useful when a disease appears in the community is the distribution of leaflets detailing what is known about the disease in question, its diagnosis, etiology, transmission, general treatment and above all, specific directions regarding prophylaxis. Most of these leaflets would be read.

Boards of health might be made good advertising mediums if they were properly constituted and conducted. If they met frequently and if health problems were clearly and tactfully presented to them by the health officer, they would not only support him much better, but each member would become a focus for the dissemination of information which would make the work of the health officer less difficult. This would be easier to accomplish if each board of health contained at least one doctor. Sometimes a board antagonistic to modern sanitation is chosen, and they appoint a health officer who is inefficient. Under such circumstances strained relations must soon develop. To illustrate how bad such a situation may become, I will quote to you what two doctors living in a small village have said to me. One writes — "I believe that our doctors do their duty in public health matters as far as

able, handicapped by a village health officer who does not believe in the germ theory of disease, who does not believe in the use of diphtheria antitoxin and tells his and other physicians' patients that it is injurious, and who does not believe in vaccination and tells his patients so, and has allowed his boys to grow to manhood without being vaccinated. You will see that the physicians in our village are handicapped." Another doctor in the same village, after saying "Our village officer is the most ignorant, ill-trained and careless doctor in the village," describes the health board as follows: "Three years ago we had a health board consisting of the following, an old and respectable man of nearly eighty, another old man equally respectable and equally behind the times, of about seventy-five, and an unusually bigoted, erratic and ignorant house painter. We now have the house painter, a poorly educated carpenter, who is energetic and would be of use if properly directed, and an intelligent and energetic moulder but very little enlightened in sanitary affairs. Imagine the efficiency of such a board working with such a health officer." Here is a village in which surely it would pay to advertise. The health officer, health board and entire community need enlightenment. If this community were taught to want better things, they would soon get them. There can be little mutual helpfulness between health officers and doctors in this village until the health department is reconstructed. One of the doctors told me he had tried to bring about a change, but without success. Whether the doctors are doing all they might to develop public sentiment may well be doubted, although it must be admitted that a campaign carried on by the doctors should be most tactful or its good effects would be counteracted by charges of personal ambition or jealousy.

One way of educating the public which has been found very useful in tuberculosis campaigns is through popular and illustrated lectures. This method might be applied to all infectious diseases.

Practitioners would be less critical if they always realized the difficulties under which health officers labor. Being political appointees, the actions of health officers will sometimes be modified because of politics. Of course this is wrong, but it is also

human. Sometimes a health officer's duty leads him to force on a community that which is good for it, but which it does not want. When his duty is antagonistic to his interests as a practitioner, he, being human and underpaid, is likely to protect his own interests and let the community have what it wants. Every health officer who is also a practitioner is a business rival of the other doctors and consequently cannot maintain ideal relations with them. When all of our health officers shall be well paid, shall be doctors of public health, shall be forbidden to practise medicine and shall be appointed for long terms in such a manner that local politics cannot affect them, we shall have wonderfully efficient health officers and much of the discord between them and practitioners will end.

Doctors seldom have good reasons for disobeying the law or for antagonizing health officers. Yet it is necessary for the health authorities to make it as easy as possible for doctors to co-operate with them, because of the great difficulty of enforcing obedience, and because of the absolute need for their co-operation. Therefore, in the spirit of mutual helpfulness, permit me to call attention to some causes for irritation which might be avoided. If, on receiving the report of a contagious case, a medical officer of the Health Department makes the first visit at the house, investigates the patient and the surroundings, prescribes the quarantine rules for the case, and if he has any suggestions to make regarding diagnosis, removal to hospital, etc., makes them to and through the doctor, little offense can be taken. But if a non-medical inspector is sent, who, acting on his own judgment, establishes the plan of quarantine and takes up any questions directly with the family, much unnecessary antagonism is engendered. After an obstetric case a doctor is usually very tired or very busy or both. Many doctors know no good reason why they should be required to file a birth certificate within thirty-six hours instead of attending to their accumulated and perhaps important business, and getting their much needed sleep. Some of them have frankly said that in case they found it a great hardship to file a certificate within thirty-six hours they proposed never to file it, for they considered the chances of discovery were less than the chances of trouble from being late. As we all know, this law is not being enforced, and that fact is a great argument against its justice.

The requirement that doctors shall file death certificates, including information which they are not at all likely to have and the obtaining of which may necessitate a drive of several miles into the country or other great inconvenience, also seems unfair. The information, other than that relating to the sickness and death of the patient, could be obtained by any intelligent person, and as other people, notably the undertakers, must visit the house after the death occurred, it would seem proper to require them to obtain and report this information. Unquestionably doctors fail to appreciate their full duty to the State and also the importance of records. If the State continues to make these requirements, the number of faked death certificates and suppressed birth certificates will greatly increase. Would it not be better to relieve the doctors of these irksome and seemingly unnecessary tasks and instead to insist more strongly on the reporting and proper care of contagious diseases. Would we not thereby obtain more complete co-operation from the doctors, a greater spirit of mutual helpfulness, and thereby conserve the public health of the State.

After all has been said, this question of mutual helpfulness resolves itself into one of education coupled with tact and kindly forbearance.

COMMISSIONER PORTER — This discussion seems to be getting right down to the point. It will be continued by Dr. Charles S. Clowe, of Schenectady. I take pleasure in presenting Dr. Clowe.

DR. CHARLES S. CLOWE, Schenectady — When I received this program and found that I was down to open a discussion on these two papers, I naturally began to stir my brain, as well as to see what ideas I had on the subject.

Now, when I come to get up here I find myself in a predicament which I should have anticipated, for the reason that the papers have so thoroughly covered the ground that little remains to be said.

When I read the first title, "The Difficulties of Health Officers as Seen by the Physician," I supposed that meant as seen by others than health officers. I find that is not true; but for the difficulties of the health officer, I see a remedy in the title of the second paper, which we have just heard, entitled "The Spirit of Mutual Helpfulness." I am willing to take that as my side, for I think I can talk best from that point. This reminds me of the trombone player who said to a friend, "I am the best trombone player in America."

"How do you prove that?" said his friend.

"I don't have to prove; I admit it," replied the trombone player; well, so it is the same with me; I admit it. I will say that it is so because it is so; and what I mean by that is this: That when I first came to the health department in our city I was fortunate enough to follow a gentleman in that work who was possessed of such an amount of medical ability and tact in handling the medical profession and the public that greatly to my surprise the difficulties of the health officer were almost nil. That is the proof of my

statement, that if we carry out the education of the general public in a spirit of mutual helpfulness the physician will find that the difficulties vanish.

COMMISSIONER PORTER — We will now hear from Dr. O. W. Burhyte, of Brookfield. Is Dr. Burhyte present? (No response.)

In his absence we will proceed to the next item on the program, "Public Health and the Press" — from the health officer's standpoint. There is a most direct relation between the public health and the press. It should be and often is our strongest ally, and its value is beyond measure in our campaign of education. I will introduce to you Dr. John B. Huber, medical officer of the State Department of Health, of New York city, who will speak on that point — from the health officer's viewpoint.

PUBLIC HEALTH AND THE PRESS FROM THE HEALTH OFFICER'S STANDPOINT

By JOHN B. HUBER, M. D.
Medical Officer, State Department of Health, New York City

The average citizen gets all kinds of circulars with every mail — asking him to vote for Jones, to try Brown's tooth powder, to help support a maiden ladies' home for ill-treated cats; all these he is likely to throw into the waste basket unread and unappreciated. But should he come upon the same matter in the columns of his morning newspaper, he will assimilate it with due interest and respect; and this is true also of weeklies, magazines and like literature. Before coming up here I read one of Mark Twain's statements, "That the public press has its faults, but you cannot waken a nation that is asleep or dead without it." It is logical, therefore, that the journalist who is willing to disseminate public health information should prove an indispensable ally of the health officer in the maintenance of the communal health. To me is assigned the consideration of how this salutary alliance may be established and improved.

In the first place, every one will upon reflection agree that the most important of all public work is the preservation of the public health; wherefore news concerning such work should be fully presented and well headlined in the press. Especially will the editor be anxious to have such news correct; and generally one finds it so in the newspapers. The average editor, in fact, gets all the statements in his columns as precise as is humanly possible, if for no other reason than that his esteemed contemporaries would make life infinitely dreary for him if this were not so. I think that the information offered concerning the public health in most newspapers is safe and sane. In the large cities, I make no doubt, medical men are retained to visé such matter, to the end that it shall be without error. But I imagine all the seven hundred newspapers in this State cannot afford such Olympian luxury. So that from time to time some fairly heavy breaks on medical subjects appear. And I submit that one advantage in a cordial co-

operation between the health officer and the newspaperman would be the elimination of such error; the former could when asked, review the journalist's copy, and correct any mistakes natural to the unprofessional mind; on the other hand the health officer could oftentimes get printed matters of vital importance to the community.

In my experience such an alliance has been altogether wholesome. During my work as a coroner's physician I was nearly every day asked for information by newspaper men. I was always able to differentiate between matters the public should know and the strictly private concerns which inevitably came within my ken; and I never from first to last had any difficulty in making the journalist grasp the difference, and in getting him to make public only such information as was intended to be such. This was fifteen years ago; and pretty much the only agreeable recollection I have of that work is of my relations with newspaper men.

I would here counsel the medical health officer, in his alliance for the public weal with the newspaper man, either to prepare a rough draft of his observation, or to write a paper — something short and crisp — detailing the medical facts he wishes to impart; leaving to his newspaper confrere the business of transforming it into good newspaper copy. In such presentations the health officer should acquire the knack of translating medical terms into such as can be understood by the man on the street and the woman at the cooking stove — the sort of people for whom the information is intended.

This is a knack not usually to be acquired without some practice; which the health officers should be willing to undertake by reason of the large salaries that are assured them. No layman will know, for example, what is meant by acute anterior poliomyelitis; but he will understand what infantile paralysis means. To write that someone died of asthenia de senectute would suggest to the laymen that one of the new-fangled diseases doctors are always inventing had done the business. It were better to write that it was just old age took off the victim.

And why should not the health officer prepare a weekly letter or article on public health conditions peculiar to his locality? This should make excellent and most interesting copy, which the

editor would no doubt welcome cordially. There could certainly be no matter of more vital interest to the community. Here, as in all phases of the communal welfare, the Health Department of our State stands ready to furnish whatever scientific material would be needed for incorporation in such articles.

And may I now address especially the newspaper man:

There is one aspect in which the health officer-journalist alliance would be of enormous public benefit; and that is, education regarding the general nature of infection. There should be clear explanation that not all infections are uniformly deadly, nor all transmitted in one way; that whilst some infections are most serious, others are comparatively innocuous. The public here sadly needs discriminative knowledge. There is a vast amount of occasionless, inhuman and indeed pitiable pathophobia or senseless fear of disease abroad; such one sees from time to time in the savage attitude of people toward the consumptive, who is absolutely harmless, so long as his sputum is properly disposed of. Such ignoble pathophobia makes itself obvious in fanatic objection to dispensaries and hospitals for consumptives, which institutions are absolutely the community's best safeguard against this disease.

No editor indeed could be more beneficently engaged than in the dissemination of right information upon matters concerning the public health. Here, as in life generally, the things that are to be feared are those which are not comprehended; and here, as elsewhere in life, terror almost invariably disappears in the presence of knowledge. The citizen who is made to understand the dangers, the sources and the nature of such diseases as are inimical to the body politic, will come not to fear them, and then he will the more readily do his part in the rational prophylaxis against them.

And such education is especially essential to the progress of public health work on our American communities, because, under our republican form of government, no laws, sanitary or otherwise, can get themselves adequately enforced without the backing of public opinion. We have thus got to create a sound and rational public opinion for the furtherance of our public health work; and to this end the local health officer and journalist, with

the ever-ready help of the State Department of Health, should earnestly address themselves. And such endeavor cannot but potently interest the citizen, immediately he comprehends that it has to do with matters intimately affecting his very life and that of his family, and the preservation of his home.

While on this phase of my subject, I venture to note that both the practicing physician and the health officer are in no slight degree hampered in their work, by reason that many journals (not nearly so many as formerly, however) print advertisements of manifestly misleading and baneful character; it is odd, indeed, that such advertisements have especially been favored by professedly religious journals, which should have the highest regard of all for the truth. Such advertisements have been particularly unfortunate and frequently of fatal effect upon the poor consumptive. A specimen of this kind has been "Kochine," a bogus concoction, in connection with which the name of the great father of preventive medicine was most perniciously exploited. Many remedies, alleged to be alcohol free (which the most of them certainly are not), are advertised as recommended by statesmen and clergymen.

I do not know whether you have heard of the following testimonial:

"Dear Doctor P. Rooney — I find your medicine excellent. After taking three bottles I was cured of the worms, but now I see snakes." (Laughter.)

In view of the fact that alcoholism is a most potent predisposition to consumption, such advertisements as the following cannot be too strongly reprehended: Blank's Malt Whiskey (an endorsing clergyman's picture). "Cures coughs, colds, most forms of grippe, consumption, bronchitis, pneumonia, catarrhs, dyspepsia and all kinds of stomach troubles," etc.

Indeed, no greater benefit was ever done to the cause of the public health and sound journalism than in Samuel Hopkins Adams' divulgence of the Great American Fraud in which such wickedness is pilloried.

Finally, I want to quote from a paper by Dr. L. L. Lumsden, of the United States Public Health and Marine Hospital Service:

"In some instances the attempt may be made to conceal the facts about health conditions in a city for fear that if the conditions become known, the business interests will be injured. It is just about as easy for a community to succeed in such concealment as it is for a man to conceal the fact that he has a broken leg, by making efforts to run. The tactics are bad and the results usually disastrous. It certainly seems more in accordance with sound business principles for a city to know its health conditions, to improve them, and then to use the improved conditions as a basis for legitimate advertising."

It is thus evident that there can be no more beneficent outcome of an alliance between the health officer and the newspaper man than the mutual pursuit of an absolutely honest course, whenever a grievous epidemic has unhappily come upon a community. Here no concealment should be countenanced, no matter what pressure may be brought to bear by the local boss or the vested interest; and here the press should hold up the health officer's hands in a manner unmistakable by the most obtuse or the most selfish unit in the body politic.

My friend, Mr. John A. Kingsbury, of the State Charities Aid Association, made a statement which I think desires to be repeated. He said to keep the newspapers constantly at it is the most important, simple and least expensive single thing which may be done in promoting the cause of public health.

COMMISSIONER PORTER — After all, the public press is to most of us something of an abstraction. There may be times when, after one reads one's favorite newspaper, and discovers some article on the delinquencies of physicians or the vagaries of the Health Department, that he views it somewhat in the concrete. It is possible to see a single editorial writer biting off his quill in his sanctum, but it is quite impossible to conceive 700 editors distilling wisdom from their editorial rooms.

We do not often have the public press, as we cannot catch it. We have it with us this afternoon, and it is able and amiable.

It is a pleasure to introduce to you Mr. F. P. Hall, of Jamestown, N. Y., who will address you on one of the divisions of this subject, namely "Public Health and the Press — From the Newspaper Man's Standpoint."

He will tell us something about what he knows of the newspaper press, and I am afraid he may tell us something about what he thinks he knows about us.

PUBLIC HEALTH AND THE PRESS FROM THE NEWSPAPER MAN'S STANDPOINT

By Mr. F. P. Hall
Jamestown, N. Y.

From the viewpoint of the newspaper man the public health, important as it is, is only one of the many important problems that bring the public and the press into close relationship. The newspaper man regards his community as his parish and every subject of human concern as rightly belonging to his domain of influence. I appreciate that there may be exceptions to the rule — but if so they are rare — where the newspaper is not ready and willing to join forces with every moment which has for its object the advancement of the best interests of the human family without regard to class, creed or nation.

The newspaper men have taken to themselves as literally as have the preacher and the priest the command, "Go into all the world and preach the Gospel," and they are striving to give a good account of the talents their Maker has given them. The newspaper is found in the advance guard of civilization, and at any point on the face of the globe where men and women gather the newspaper of the day goes with them to entertain and instruct.

The co-operation of the press is as necessary for the advancement of any cause as is electricity for propelling the electric motor. The car may run down grade without power, but when it strikes the hill or the hard places the electric current is necessary or the force is quickly spent. Any proposition may find advocates and devotees, but no cause can long endure that does not have the power of the press behind it.

If the newspaper fails at times to advocate that which is for the best interests of the community in which it is published, I believe the fault more often is with the leaders of the movement than it is with the newspaper man. These leaders have failed to take him into their confidence; they have failed to acquaint him with the real situation and with the real needs of the community and of the cause which they may be upholding with zealous ardor.

I am glad to say that the old policy of keeping information from the newspaper man, compelling him to go to unofficial and often unreliable sources for his news, is rapidly passing away among intelligent public officials. The time was — and not so very long ago — when the heads of the police departments of our cities declined to give information to the press as to crimes that had been committed. But it is recognized to-day that publicity is of the greatest aid in the detection of criminals. The time was — and not so very long ago — when physicians and health officers either declined to give information to the press as to epidemics in their communities or suppressed part of the facts, and when newspapers were frowned upon for giving news of the development of a small-pox or diphtheria epidemic.

To-day the usually accepted policy of the guardians of the public health is to give the fullest information on these subjects, finding that when such information is full and complete the public shares with the sanitary officer and the board of health the responsibilities of the situation. It is found that when the public is informed of exact conditions it has a tendency to allay alarm, while the opposite course creates suspicion and results in lack of confidence in the guardians of the public health.

To-day the State and national governments maintain press bureaus for sending out the earliest and most complete reports as to actual conditions in all departments of public service. But too often city officials still retain the old policy of attempting to keep the public in ignorance as to what they are doing, but it is generally with discredit to their administrations and with the loss of confidence of the people whom they serve.

The work of the Health Department of the Empire State occupies an important place in the administration of State affairs. No other department of government comes quite so close to all of the people as that which you sanitary officers represent. The manner in which you carry forward your work means life or death to many of our citizens; it means either health and comfort or sickness and sadness; it means progress along rational sanitary lines or it means carelessness upon your part and the part of the people of the various communities where your work lies.

Let me urge that in this work you seek rather than repel the co-

operation of the press. Any reasonable request you make of the newspaper man will be complied with, and any reasonable request he makes of you should have a ready response. The newspaper stands between you and public opinion; you cannot override it and you cannot suppress it. Then why not work with it and let it work with you and for you. While you may find it difficult to work the newspaper, you will always find it easy to work with it.

This is one field of co-operation that has always brought good returns upon the investment. I know that our efficient Commissioner, the man who stands at the head of the New York State Department of Health, fully appreciates this sentiment. In my acquaintance with Dr. Porter as a public official I have found that he has learned the real value of the newspaper as a factor in the good work that his department of government has been able to accomplish. Never before were the reports of the State Health Department to the press of the State so complete and accurate and crisp as they are to-day.

That which Dr. Porter has done for New York State in this respect you, the sanitary officers of its many communities, can do for the places you represent. Your work in the community is occupying a more important place than ever before; your responsibility is greater at the present time than it has been in the past; more is expected of you and your opportunities for serving the people are greater to-day than they were yesterday, and as the years come and go they will increase.

Let the newspaper men preach your sermons on cleanliness and sanitation; give them the information upon which the lessons which every community must learn can be prepared. Moses made Aaron the mouthpiece for his messages to the people, but you have the mouthpieces for your official or professional knowledge to which the public is entitled at your hand. The press of your community is ready to serve you if your service is for the public good; it is ready to aid you in creating a more wholesome appreciation of the importance of better sanitary conditions and the observance of the rules that experience has laid down for the protection of the public health.

Speaking from the standpoint of the newspaper man, as I have been asked to do, all that we ask is the opportunity to co-operate

with you in the great work that lies before us. We do not wish to dictate to the sanitary and health officers, nor will we accept your dictation as to what we should do and what we should leave undone. If you tell us candidly the conditions which exist and the remedies which should be applied, you will find the newspapers as true a mouthpiece as Moses ever found Aaron. If there are reasons why certain legitimate news items should not be published, you will find the newspaper man ready to recognize them. But the facts should be given to the press together with the reasons, if there are any, why they should be temporarily or permanently withheld. That would be the intelligent and effective way of handling an annoying or embarrassing situation.

Our experience has been that the public is always ready to accept an intelligent suggestion from one in authority. It is much easier to educate your constituency as to proper sanitary precautions than it is to drive an uneducated constituency to adopt them. The conflict between sanitary officers and the public generally comes from a lack of appreciation of the value of the regulations which the officers have formulated. It is rare indeed when there is any formidable revolt against compliance with health regulations, and if there is, then, in all probability, it is because the health officers have attempted to ride roughshod over the long-standing habits and prejudice of the people without having taken the trouble to remove these prejudices and correct the habits which a little printers' ink, judiciously used, might have done.

Let me advise you as public officials to take the newspapers into your confidence, and through them you can quickly reach the confidence of the people whom you serve. A suggestion, with reasons therefor, is often much more effective than an arbitrary command with reasons withheld. With all of his progress and advancement the average American citizen has not yet reached that stage where he will willingly take orders from our public servants unless he knows why the order is given and what effect it is to have. I appreciate that you have the law on your side; that if taken into court, what you say goes, and you should appreciate that when you find that course necessary, it would probably be advisable for you to go also. If you want intelligent co-operation with your public, then your public must be educated

to the necessity therefor. You might better spend half an hour every week in writing a short, crisp sanitary suggestion for publication in your local newspapers than to spend an hour a day in arguing the matter with some individual who refuses to be convinced.

COMMISSIONER PORTER — I said that the public press was an abstraction before Mr. Hall started. We have seen it now in concrete form, and we have more of the public press here, and it is also substantial, in the presence of one of the leading editors of central New York — a man of force of character and clear conviction — and it gives me great pleasure indeed to present to you Mr. Milliken, of Canandaigua, who will discuss these papers.

HON. CHARLES F. MILLIKEN (Canandaigua) — Mr. Chairman and Gentlemen of the Conference — Permit me to congratulate the members of the Conference in having as your presiding officer an official who has endured without investigation or removal the white light that has enveloped all the State departments throughout the two terms of the Hughes administration.

I wish that I might almost have been introduced in an official capacity, because the remarks of one of the gentlemen who has preceded me under another heading brought the thought that the Civil Service Commission might render to the State Health Department an additional help. And the fact that you, or one of your representatives, admit that you are the creatures of the politicians and subject to their will, in large measure, leads to the suggestion that the time may come, and perhaps ought to come, when the health officers of the State will be brought under the protection of the State Civil Service Law, and in that way their efficiency secured and their tenure of office secured through a length of time determined by efficient service.

But it is as a newspaperman that I am expected to say a word to-day. I asked Dr. Howe, the Deputy Commissioner of the Department of Health, what he wanted me to say, and he told me that he thought I ought to urge you to enlist the aid of the press in your work as health officers, and bring the press into co-operation with yourselves.

Now, I submit that the press has been the pioneer in some of this movement for the public health. What movement for reform of any sort, either in your department or any other department, has not in a sense been pioneered by the press? It may be important, as one of the speakers has said, to keep the newspapers everlastingly at this campaign, but I submit it is the province of the newspaper to keep you everlastingly at it in this work; and I think we are doing our part to-day.

What crusade against dirty streets or garbage piles or offensive smells or contaminated water supply has not had the support, the ardent support of the press? I admit that the newspapers have had faults, as was pointed out, especially in regard to their advertising columns. It is true that we have admitted most nauseous and improper (from my point of view) advertisements to their advertising columns. But remember that the newspaper is a business enterprise, and it must be supported in some way. And also there may be urged an apology for the course the newspapers have followed, but I think with very decreasing custom, in the fact that through some sort of gentlemen's agreement among the physicians, they are deprived of the support of the profession in the way of advertising — and they feel it.

But, lay joking aside, it is important for the newspapermen and the public health officials and physicians generally to get together in any crusade for the public health. Certainly in such a crusade the newspapers have an opportunity and a duty, as they have had in many other spheres of reform and public improvement. Note how they are helping, how their aid is solicited and secured by Commissioner Pierson in his work, by Dr. Reichman, the State Superintendent of Weights and Measure, in his crusade against dishonest retailers, by the State Board of Charities, and you will recall that the chief executive of the State, when he wanted to overthrow a

discredited political machine, appealed to the public through the newspapers, rather than attempt to fight fire with fire, and set up another machine. It is certainly the most effective agency for the promulgation of any reform or movement for the betterment of the public.

Together we may move mountains of fly-producing dirt. Together we may dry up or cover with oil lakes of mosquito-producing water; recognize the newspapers as your friends. Give them your confidence, as Mr. Hall has said, and aid them with suggestions. Support them in every way possible. Visit the editor in his sanctum, be it the autocrat of the great city paper or an out-at-the-elbow country editor. Visit him in his sanctum and give him your confidence and your help. The newspapers are ready to help in every practicable way, as you, and certainly Dr. Porter, know. There are opportunities of which the newspapers are availing themselves, of printing week after week prepared articles of practical value to the public health. It has occurred to me that that system might be followed to an extent that it is followed by every political organization. During every campaign they send out in plate form campaign arguments, and something of the sort would be appreciated, I am sure, especially by the country editors.

The newspaperman will give you his aid regardless of selfish consideration. Certainly that is true in Buffalo. Certainly it is true in clean, comfortable Canandaigua, and certainly it is true in most communities of the State, that the editor will not count his personal interests in the matter, but will aid the public cause.

I read some time ago that the fourteenth and fifteenth centuries were notable as being prolific of new diseases. I think the nineteenth century was not laggard in the matter; but let us make the twentieth century famous for abolishing some of the old diseases, famous for the recognition of the fact that we are keepers of our brothers' health, all of us sanitary officers, physicians and newspapers.

COMMISSIONER PORTER — We gave a greeting to Mr. Milliken as he came to us, as "The Distinguished and Wise Editor." We hail him as he departs from the platform as the astute and farseeing president of the Civil Service Commission of New York State. And let us indulge in this hope, that those folds of his official garment may soon envelop us so that with adequate salaries and life tenure of office we may perform those duties that a grateful public throws upon us.

The discussion will be continued by one of our own number, Dr. Snyder, of Newburgh.

DR. WM. H. SNYDER (Newburgh) — As I listened to the discussion of this subject, the public health and the press, it seemed like a sweet dream; but my experiences have been a sort of nightmare on the subject, and I think I would leave it where it is — that is, with the Commissioner.

COMMISSIONER PORTER—It is much easier, I find by experience, to introduce a speaker and then leave it to him than it is to leave it with yourself on an occasion like this. However, there are one or two things I would be glad to say concerning public health and municipal authorities and what a health department expects from a municipality.

WHAT A HEALTH DEPARTMENT EXPECTS FROM A MUNICIPALITY

BY EUGENE H. PORTER, A.M., M.D.
State Commissioner of Health

It has been said that this is an age of science and ours a nation of science. Observation has matured in measurement and passed from the qualitative to the quantitative, generalization is a habit and precision is becoming a commonplace in current life. More than all else the course of nature has come to be investigated in order that it may be controlled and redirected along lines contributory to human welfare; invention has become a step towards creation, and is extending far beyond the merely mechanical and into the realms of the chemical and vital.

The advance in sanitation is an index of the progress of modern civilization. The development and application of sanitary law is the result of an increasing altruistic knowledge.

Behind every movement for civic improvement, back of every effort for social or economic betterment, may always be found the moral impulse that stirs to action. Sanitation, with all its wealth of scientific achievement, with all its earnest and able workers, would never had made such rapid advance without the aid of an aroused and partially emancipated public sentiment. When many men thinking independently come to the same conclusion, action is likely to follow, and when men so thinking demand facts and carefully weigh the evidence there is likely to be action along right lines. Education is the dynamite of our civilization. It has broken some of the follies of superstition and ignorance and will break many more.

So education in sanitary science had not progressed very far before it was perceived that a great door had been opened for general betterment. Not merely stamping out of epidemics, the disposal of sewage or investigation of water supplies, important and urgently necessary as these are, but that wider field that embraces all that makes towards the absolute prevention of all misery and disease came clearly into view.

And so there came into being that great and increasing number of societies and organizations devoted entirely to changing the old order of things, working always for clean cities, clean homes, clean air, and also, therefore, for clean morals.

These societies that look after proper playgrounds, sufficient parks, decent tenements, pure food, clean streets, efficient factory supervision, protection of child labor, care of working women, pure water, tuberculosis, and many other things are all playing a most important part in the great struggle of the new against the old — of knowledge against ignorance. Deprived of the aid and strength of these auxiliaries sanitary science would have halted and stumbled much more than it has. These societies are almost always composed of laymen and not of trained sanitarians. This is most significant, for it shows how rapidly education in sanitation is progressing.

If it is true that at times the enthusiasm of some of these lay workers remains untempered by judgment, and that they seem to prefer occasionally to work against rather than with the health officials and so miss the greatest possible effectiveness, yet that should count but little against the immense amount of good work they are doing. Their appearance and continuance is one of the most significant signs of the times.

But after all, if we are to have this real sanitation, the sanitation of a wider view, we must widen the vision of the people. For the great problems before us in sanitary science must be solved by experts. The question then is not what will our laws do for us, or our Legislatures do for us, or our courts do for us? The question is, what will our schools do for us? It comes to that in the last analysis. For if we are to reach our final goal we must have a greater efficiency, a greater sense of justice, a greater self-sacrifice that must come from a high type of citizenship. So the duties and responsibilities of a health department are not only changed, but they are very greatly increased and constantly changing.

To cause the citizen to do the things he can and ought to do, and then do for him the things he can not do, but should be done, is the duty of the State.

The entire system of health supervision and control is insep-

arably bound together. The highest efficiency can only be obtained by co-operation. The basis of this co-operation must be a general sympathetic and intelligent comprehension of methods adopted and results desired. This is precisely the relationship that should exist between the local health authorities and the State health authorities. When it is clearly seen that one cannot hope to fully succeed with the other; when it is cordially recognized that interests are mutual; when antagonisms born of ignorance are replaced by the confidence that comes from wider vision; when political domination is stamped out; when none but competent and trained sanitarians possess authority in health matters, then will come that perfect adjustment and inter-relationship of local and State health administrations that we are anxious to attain. Now I believe that the local health officers in nearly all cases and the local board in some instances are anxious to work in harmony with the State Department of Health. This would be indeed the expected and most natural thing for them to do. But experience teaches that in some cities and towns harmonious relations are difficult to establish or maintain. It has seemed to me that in most of these cases the difficulty lay in a lack of knowledge of the purposes and plans of the State Department on the part of the local authorities and at times doubtless the Department failed to get the right angle of vision when it viewed the local situation. And so I would put down as the first important requisite for a satisfactory relationship between local health authorities and State health authorities —

(1) Mutual knowledge and understanding.

The experiences of the Department in cases where its plans were not understood and where, as is generally the case, there existed a profound ignorance of the health law, have been both ludicrous and vexatious. We have been accused of violating the law in enforcing sanitary measures and we have been charged with gross neglect of the law under exactly similar conditions; the Commissioner has been termed a Czar and despot in some localities and in others while trying to effect the same results as in the first, he was called inefficient and spineless. Some cities have welcomed reports on their sanitary condition and adopted at least some of the recommendations, while others have resented

these reports as "attacks" and vigorously opposed their publication. Most cities and towns welcome our aid in times of trouble but there are and have been some who seem to think that our only desire was to cause them trouble and expense. This lack of understanding and consequent want of co-operation is a most deadly thing — it costs lives that could and should be saved, besides the always increased expense.

In one case out of many, where the Department had made repeated investigations and inspections of a threatened water supply, and report after report and letter after letter urging immediate action had been sent to the health and other officials of that town — without result — typhoid fever came. Over one hundred cases and twenty-five deaths. The day will come when such neglect of plain, sanitary duty, neglect that causes unnecessary and preventable death, will be looked upon and called by its right name — murder.

But I must not tarry. The first thing then is to get together — to find out — to understand.

2. Politics and Waste.

I spoke just now of those towns that are fearful of the expense involved in any effort to better conditions. Economy in health matters is generally parsimony, born of ignorance and selfishness. This reluctance to expend reasonable sums for the public health is not a flattering reflection on our vaunted modern civilization. But we are learning. We have learned that if we allow our neighbor to dwell in foulness and filth some of us go with him over the great divide when the plague rages. But it is still true that in many places there is a strong disposition to hide the presence of contagious disease — to conceal the visitation of smallpox, diphtheria, typhoid or scarlet fever. This also is vanity and is the child once more of ignorance and selfishness. Ignorance that prompt action by efficient health authorities would limit and conquer the outbreak; selfishness, since before business interests could be allowed to suffer imaginary damage, innocent visitors and equally innocent citizens are exposed to the dangers of a contagious disease. In the end the cost is greatly increased by the policy of concealment.

And yet we must recognize that there exists some reason for this state of affairs.

The evidence is conclusive that in municipalities, counties, states and the national government itself there is a vast and growing amount of extravagance, mismanagement and waste in the administration of public business that is now a burden to the country. The bonded indebtedness of American cities as a whole is increasing much more rapidly than municipal assets, and the taxes for operating expenses are becoming more burdensome each year. In 1902 the percentage of the revenue of all the cities in the country to their debt was 37.3. By 1909 this percentage was decreased to 25.9. The net public debt of forty-nine cities, including New York, increased 47.71 per cent., while during the same period the increase in the assessed valuation of all the taxable property in these cities advanced but 12.66. It is certain that this course if continued will result in intolerable conditions. Many of our towns are now bonded to the limit.

These are some of the reasons why appropriations for public health are difficult to secure, but they are not reasons to be proud of. Inefficiency in public service resulting in shameful waste of public funds is a burden the weight of which public health has in part at least to bear. I am not charging that dishonesty invariably exists in governmental affairs, but I do say that there is incapable business management, and that, in large measure, is the fault of the system and not of the men. So there is not enough money for the health departments, playgrounds, clean streets, pure water supply, proper sewage disposal and other needed sanitary reforms.

Turning away from further consideration of this question, we stumble over another burden of which we must rid ourselves if we would hope for desirable results. Politics must be driven out and kept out of every health department, national, State or municipal. If the efficiency of health administration is to be expected, politics must play no part. The men to serve the public health must be trained men. They must have had special and technical teaching fitting them for the duties required by the science of sanitation. The men to serve public health must be experienced men. They must be experienced in the practical

workings of an actual health department. Laboratory methods and field investigations must be among their more familiar scientific acquisitions. The men to serve the public health must be studious, honest and energetic men. It is evident that, however well-meaning a politician might be, he would not very often be able to nominate for a health position a man possessed of the necessary qualifications.

The tenure of office in a health department should be dependent on efficiency and good behavior, and on these alone. Should politics dominate the policies of local health authorities, or should the State authorities be controlled by politicians, harmony of action would be impossible. The spirit, the essential and living force, would be dead and progress impossible.

The second point then is: to endeavor as citizens to lessen administrative waste so that health authorities may secure more adequate appropriations. Let our motto be: Fewer laws and better laws. And then eliminate all politics, for unless this is done the most efficient harmony of action is impossible.

THE POWER OF EDUCATION

But the combined administrative strength of all our health divisions, both State and municipal, will never reach its fullest efficiency — will never gain an entire cordiality of support from our people, until we invoke the power of education in sanitation.

We are just beginning to realize the lack of trained men among us. This is shown by the great difficulty of finding capable men to fill responsible positions. The preliminary training is wanting. When we turn to our schools throughout the country at large, we find we have a great educational machine that does not train. It does not train men in the things related to the lives they must lead. The great mass of our citizens begin life's work when and where they can. They bring to this work a smattering of knowledge, very little of which is in any way directly applicable to the every-day facts and practicalities of life. So the boy or girl in the country learns nothing of the science and art of agriculture, the thing that most deeply and vitally concerns their future lives; the boy in our city schools learns substantially nothing of the fundamental principles of the mechanic arts; and neither country nor city child is taught anything concerning disease and health.

When we stop a moment to consider what wide significance of meaning, what great scope of utilitarian activities, is embraced to-day in the term public health; when we remember that its every-day applications touch life at every angle, we are justified in demanding that our schools give this necessary life training. These are some of the things our boys and girls need to know and must know not only to save their own lives, but still more important, in order that they may, as trained and intelligent citizens and sanitarians, save the lives of others.

The work of any health department to-day is regarded with cold indifference by a majority of our citizens. Public sentiment is often opposed to very urgent and necessary sanitary measures. The present generation — untrained, uninformed and so in unregenerate contentment with present evils — is inert and unresponsive. The trouble is they do not understand. We can let the light shine on some of them, but it is the children that we must get after. Teach the children of to-day and the fathers of to-morrow will enlist in the army of progress.

So in this campaign of education, the State health authorities and the local health authorities meet again on common ground. By joining forces, both together could do more effective sanitary educational work in one year than could be done by either alone in five. I have no time for details, but in such work the local authorities could take full charge of local arrangements, including places of meeting, advertising, speakers, etc. The State department would furnish expert lecturers, give illustrated talks, provide circulars, pamphlets, and in short do all it could to promote the success of the campaign. It is a great field and we should not delay its cultivation.

So the third point I would make is: that we demand that sanitary science and public health be adequately and properly taught in all our schools and that we begin at once our own campaign of education among our people.

CONTAGIOUS DISEASES AND QUARANTINE

The State Health Department is at present striving to build up and perfect a Division of Communicable Diseases to the end that contagious diseases throughout the State, but especially in

our smaller towns and villages, may be promptly and efficiently dealt with. The chief thing that hinders is lack of money. But while we cannot as yet cover the entire State, we are ready to respond to calls for help. Once more we stand upon the same platform. Our common aim is to suppress communicable diseases and to do it swiftly.

In the case of an epidemic in any city, our services and resources are entirely at your disposal, if you need them. If the effect of our moral support is needed, it is yours; if in emergencies toxins or antitoxins are urgently needed we will furnish all we can; if you desire aid in conducting investigations as to cause of disease or reports on existing conditions, we will give all the help within our power. It seems very clear to me that the State and local authorities should work earnestly together in every instance of outbreak of contagious diseases. And so my next point is: unity of effort in the suppression of epidemics.

WATER SUPPLIES AND SEWAGE DISPOSAL

If there are any questions the solution of which requires the hearty co-operation of both State and local authorities, it is the adequate protection of public water supplies and the proper disposal of sewage.

These problems are not limited by the boundaries of particular localities. They may and generally do affect, in their solution, numerous other communities, in addition to the locality of origin. For the pollution of a stream may and often does affect people living along its banks for hundreds of miles. In certain cases it becomes an interstate question — as in the case of the pollution of the Delaware. In the final determination of these questions the State Health Department, with its State-wide outlook, its special information of the particular conditions existing in the various communities, should be able to give most valuable and timely assistance. It has seemed to me at times that in no other line of health work has the attitude and policy of the Department been so misunderstood or so persistently misrepresented. Of course the misrepresentation in the main has been because of lack of knowledge; but based on this very want of information inferences were drawn, and the sublimed postulate is that publication of inferences is not justified in equity.

Almost every town in the State of New York is to-day discharging raw sewage into some stream or lake. All the mills and manufacturing establishments in this State are discharging their waste products in our streams, and our streams are burdened with more than they can take away. This is the present condition. Now we know what should be done in order to prevent the continuance of such dangerous and obnoxious pollution. Sanitary science has after many years of research work and experimentation afforded us a solution; and there is no longer any need or excuse for a municipality to discharge its raw sewage where a menace to health or a nuisance can be thus avoided. To make clear the position of the Department I will quote very briefly from two addresses of mine given in 1908 and 1909 respectively.

In the former address I said:

"Before any intelligent or coherent steps in direction may be taken concerning the purification of any stream, the entire watershed to which it belongs must be thoroughly studied.

"The sources of water, character of soil, number of villages and towns, population of such, conditions of sewage, conditions of water supply, manufacturing establishments and their various wastes, maximum and minimum flow of the main river and its tributaries, all these things and many more must be learned before it can be intelligently decided whether the single town above referred to shall or shall not be required to put in a sewage disposal plant. In other words, this work of the purification of our streams must proceed along broad and comprehensive lines. Otherwise it will make no permanent and satisfactory progress."

In the latter:

"Well, let us see about removing this pollution to-morrow — that was the point I wanted to speak of. It seems to me that this is a problem not to be solved in a moment. The follies of a century can not be corrected in a year. Municipalities now bonded and taxed almost to the limit can not, in a single day, undertake the installation of extensive sewer systems and sewage disposal plants. Mill owners who have invested millions of dollars, manufacturing establishments that employ thousands of people, upon whose industry whole towns depend, cannot be expected to make such a total change in their process of manufactures as to get rid of waste in a day when we are utterly unable to tell them what to do with it.

"The pollution of our streams and our lakes must stop. Yes — it must stop — in time. In the meantime let us remember that time is the greatest factor in the solution of this problem.

"In 1875 the Royal Pollution Commission was appointed in England because they became aware then of the conditions and realized the danger in the pollution of their waters, and in the last report gotten out by this learned commission or the successor of it, you will read that they passed a resolution that they felt that now the time had arrived for a thorough and systematic study of the situation. We learn from them, do we not, that time is a factor that enters into this. Massachusetts said that after twenty years of effort that the streams that were polluted then are polluted now, and that what had been done so far was to prevent an increase of pollution."

This states clearly enough, it would seem, the policy of the Department. With a full realization of the enormity of the present pollution of our waters, with an earnest determination to prevent further pollution, it also clearly recognizes the difficulties in the way of an immediate removal of the present discharge of wastes.

Each municipality presents its own particular problem. No two are precisely alike. I believe the wisest way to solve these questions is by the cordial co-operation of State and local health authorities. The Division of Sanitary Engineering and the Division of Laboratory Work both well equipped are entirely at the disposal of municipal authorities. They will in all cases give their best expert judgment and advice as promptly as possible.

The purpose of the bill designed to regulate pollution of streams, introduced during the last session of the Legislature, was widely misunderstood. It was prepared after several years of study; the laws of all other states and of foreign countries were carefully compared and the results attained noted; the conditions existing in our own State were thoroughly considered and the bill as drawn was the result. It had the approval of the leading sanitarians and sanitary engineers in the country.

Now this bill provided that after an investigation and after a hearing for all interested, the Commissioner of Health might issue an order requiring a town or a mill owner to cease discharging raw material in streams or waters of the State. But this order was unoperative unless approved by the Governor and Attorney-General of the State. I believed and I think that you do also, that there must be somewhere a restraining and controlling power, and that this power should be itself surely held within reasonable limits. This I believe the bill provided for. [illegible] the

bill would be to bring about closer relations between local and State health authorities, a joining together of resources and a mutual solving of difficult problems. In my judgment very few orders would ever be issued under the provisions of this bill. The point I would make here is then — the heartiest co-operation of municipal authorities and State health authorities in the protection of public water supplies and of sewage disposal.

Finally let me emphasize the fact that the business of the Department of Health of New York State is to aid in health matters in every way possible. Our experts are yours; our laboratories are yours; our experience is yours. Let us get together and profiting by each other's knowledge, turn our combined wisdom to the benefit of the people of our State.

COMMISSIONER PORTER — The next paper is "Public Health and Municipal Authorities — From the Standpoint of the Municipal Officer;" and on this subject we shall have an experienced and valuable municipal officer to talk to us. I am pleased to introduce Mayor Charles C. Duryee, of Schenectady.

MAYOR CHARLES C. DURYEE — Ladies and gentlemen, I am the last to speak to-day, and the only merit I shall claim for what I have to say is that it is brief.

PUBLIC HEALTH AND MUNICIPAL AUTHORITIES FROM THE STANDPOINT OF THE MUNICIPAL OFFICER

By CHARLES C. DURYEE, M.D.
Mayor of Schenectady

The health officers of the State of New York occupy a more important position in the mind of the people than perhaps those of any other State in the Union. The spectacle of forty-two out of forty-nine cities in the State being represented at a convention held within the year for the specific purpose of discussing only matters pertaining to public health, is one that is indeed inspiring and encouraging to those workers who are striving for ideal public health conditions. It is questionable whether before this Conference some of the mayors realized they had a health department, or, if they did, they regarded it a department that was necessary for use only in times of epidemics and dire public health danger; but the discussions and addresses brought home to the executives and public officials of many of our cities and villages in the State of New York, the fact that the health department of any locality is one of its most important assets, and that it is constantly and consistently working at the keystone of the arch of municipal safety and comfort.

Many other activities in this State have conspired to increase the importance of health departments, notably the campaign against the great white plague which is being waged so successfully throughout the State; the movement against the pollution of our rivers, lakes and streams so admirably and justly conducted by our State Department of Health; the spread of the knowledge that diseases that were formerly considered noncommunicable, are now known to be communicable, and an increasing and better understanding of the manner of transmission.

Slowly but surely the importance of the Health Department is increasing in the public mind; its duties are becoming amplified, its responsibilities greater, and the growing confidence in health officers and health departments is becoming more evident day by day. In view of these circumstances the health officer should do

more than heed the wishes of the community in which he lives. He is to-day a leader, not a servile follower of public sentiment. He is a creator of public opinion. It becomes, therefore, the duty of every municipal officer to render such assistance to the Health Department as he may be able, to bring about the conservation of public health in his commmunity and compel the community to keep step with the drum beats of progress.

In the first place the municipal officer should aid the Health Department by a sincere and active co-operation. I include in this the officials of all the departments and bureaus of cities and all other similar agencies in towns and villages.

The police department can be of great service to the Department of Health in co-operating in the observation of conditions and the enforcement of laws and regulations. The patrolman as he covers his beat comes in contact with many conditions that might not otherwise be reported to the Health Department, and the mere fact that the patrolman is paying attention to those things that make for better public health is an inspiration to the citizens along his beat.

The fire department, too, in many ways can contribute not alone to the removal of unwholesome health conditions but by precept and example may assist in spreading the health propaganda.

The bureaus of the department of public works can aid by actively co-operating with all the movements toward the betterment of public health, as for instance in the proper cleaning of streets, sanitary care of public buildings, proper disposal of garbage and sewage and the maintaining of a pure and wholesome supply of water.

The executive of a city should extend a sympathetic and helpful support. The mayors of cities and presidents of villages have within their hands the greatest power to enhance and increase in value all the activities of a health department.

The duties of the health officer should be viewed by all municipal officials as being practically the same as that of an inspecting officer in the army. In fact there is not a department or bureau in the city, executive, legislative, charitable, public safety or public works, in which some part of their duties does not touch shoulder to shoulder those of the health officer. Every public

official in some way is a health conservator, with the health officer as the leader. It therefore seems to me that the attitude of all municipal officials toward the health department should be more than casual and should reveal a sense of co-operation as wide as the conditions may permit. The health officer should be looked upon as an expert in conservation of public life whose advice on many of the subjects that tend to make a city fit to live in, may be wisely and frequently solicited.

Recently I said that:

"When we realize that it is probable that within a short time fifty per cent. of all diseases will be placed in the column of preventable diseases, it should be clear to us that the attention given to public health matters should bring to the health department its true and proper position; that the best talent, both scientific and executive, should be placed in the control of such departments, and that niggardly and insufficient appropriations to the departments of health should be no longer tolerated.

"No one who has watched the generous appropriations accorded the police and fire departments of municipalities will regret such liberal assistance. Important as are these departments, the great bulk of their work is directed toward the preservation of property and protection of society. The police department is, perhaps, the oldest of all municipal activities, and is as ancient as government itself.

"The health department in any organized and permanent sense is one of the youngest of municipal activities. The health department must deal more directly with the conservation of human life. Its equipment should be broader and better. The money appropriated for its use should not be extravagantly expended, but no consideration of mere money should stop the saving of the infant and child, and the preservation of the family during its period of greatest productiveness, and the protection and preservation of life on its downward way.

"It is, of course, impossible to make any accurate measurement of the value to the community of these three departments; all are admittedly essential. A question which would doubtless arise in the mind of most persons upon hearing this topic is whether the oldest of these departments, by virtue of its age and by reason of the strength of tradition, may have retained an undue importance in the matter of facilities, men, and appropriations, as compared with the younger departments. How does the work of those two departments in its value to the community and

the duties imposed upon them by statute, compare with the equipment, men and means placed at their disposal, respectively?

"Compared with the two other departments, the health department is woefully undermanned and underequipped. Its aim is the protection of the comumnity from evils that are widespread, ever present, and comparatively little understood. The economic waste arising from the loss of human life through preventable disease, which our health departments could overcome, is vastly greater than the economic loss arising from crime and disorder, or from fire. Laying aside for the moment the question of sentiment, questions as to the value which should be placed upon human life, questions as to our duty individually and socially to take all practicable steps for the protection of human life, irrespective of its economic value, is it not clear that purely as an investment of public funds the health authorities are entitled to a much larger proportion of the City's resources? We are apt to forget the actual money value of human life."

In this way and by these means all municipal health officers should seek to bring about a wise application of the recent knowledge which has been so potential in promoting the health of communities in this country, in order that the division of municipal government which is so important to the creation of conditions of public health and comfort, which are the essential features of a modern city, may be accomplished. The city in the future will depend to a greater extent than now on municipal health control for the preservation of human life, the greatest of all national assets, and should therefore make it the aim to give greater consideration to all efforts for the promotion of efficiency along these lines.

The ideal city is not one in which the beautiful alone is considered, but one in which there is a combination of health and beauty, and this can be obtained only by what we may term team work on the part of all municipal officials, with the health officer as the leader, backed up by an enlightened and educated public. For without the assistance of the citizens of a city and their moral support, no campaigns for cleanliness, decency and health can be effected. The competition along cities is to-day of such a character that no city may expect to be successful without giving ample consideration to all the conditions that tend to promote its public health. Co-operation of officials should be voluntary and active; co-operation of the people can be easily obtained by education.

I have thus indicated briefly some of the ways in which all municipal officers can lend their powerful aid in raising the standard and solving the problems of the living conditions in a community. If this plan is carried out, it will make for greater economy of energy in the administration of public affairs by avoiding duplication of effort.

COMMISSIONER PORTER — When we adjourn now we will adjourn until 8:00 P. M., to meet again in this room for the evening meeting, which is our "Public Meeting."

I hope to see you all present.

WEDNESDAY, NOVEMBER 16, 1910, 8 P. M.

THIRD SESSION

PUBLIC MEETING

Presiding: Deputy Commissioner HOWE.

THE CHAIRMAN — There are some good things in store for you to-night. We have the double pleasure of having not only one of your residents, a man who has done things for Buffalo, but we have a neighbor, a man who is doing things across the big line; and our interests are mutual in many ways, because, residing in the city of Buffalo, there are many who were born in his native land, where he is now accomplishing such splendid results along the line of health.

If there is anything which is admirable in either a man or a woman, it is the ability to accomplish things. The man who is capable of leading and interesting others, and inducing them to follow, is the man who leaves an indelible mark behind him.

The first speaker to-night is a gentleman of those characteristics. He is a man who is now shaping, and who in the past has shaped, the health work in the province over which he presides, and whose record will go down in the annals of that province as one of the most brilliant — yes, the most brilliant — in its history; and it is with more than personal pleasure — it is as representing the Department of Health — that I have been asked to present to this meeting to-night, our first speaker, Dr. C. A. Hodgetts, medical adviser of the Commission of Conservation, of Ottawa, Canada.

DR. C. A. HODGETTS — *Mr. Chairman, ladies and gentlemen* — I did not catch all of the words of our Chairman, but I fear he has been altogether too flattering in his introductory remarks. I am simply a health worker like yourselves. The only difference is I am free from political or municipal environment, which I wish you all were. I have been there, and I hope that the day will come when in the length and breadth of this great continent, not only of the United States, but in Canada, the health officers will be free from municipal and political environment.

I have the honor of serving the Conservation Commission of Canada. I suppose to copy is not a discredit. We have copied one of your great American citizens in respect to conservation, and to-day the Conservation Commission of Canada, by act of Parliament and Senate, is a living organization, looking toward the conservation, not only of the natural resources, as regards our forests, streams, mines, etc., but in regard to the conservation of the public health of the people. I only wish that condition of affairs now existed; but when it does, I shall look forward to a great advancement in public health work over here.

Now, sir, as you will not consider me in any way touching upon political lines, as I am a Canadian (of course, we have no politics in Canada), I have to congratulate you all in this great republic upon all being republicans. Of course you have your political leanings, but I only trust that the work begun in the Empire State of New York, and a work which personally I have had the pleasure of viewing for the past six years under the Commissioner of Health, I only trust that good work, notwithstanding the changes which have taken place in the past few days in your State and in your country, I hope the good work begun, and which has been carried on with such great interest and advantage to the people of the State of New York, will be continued free from any political environment.

As health officer of the province of Ontario, it has been my privilege to attend four or five meetings of this Conference. I have not appeared prominently among you, but I have always been interested in the Conference of the Health Officers of the State of New York, and I have viewed with interest year by year the improved condition of the officers of New York State; and I trust the good work begun will long continue under its present regime.

PUBLIC HEALTH AND THE CONSERVATION MOVEMENT

By CHARLES A. HODGETTS, M.D.
Medical Adviser, Conservation Commission, Ottawa, Canada

Although so much has been written and spoken in regard to the conservation of national resources on this continent during the past year or two, there yet remains much more to be said and infinitely much more to be done before one can speak with assurance of the movement taking that prominence in the life work of the nations that its importance justifies.

During a century and more there has gathered together upon this continent an aggregation of people of all nations and languages such as the world's previous records can never compare with.

This exodus from the older and more densely populated lands of Europe still continues and will progress notwithstanding the most severe and rigid immigration laws which can be enforced. "Westward the march of Empire" is more true of the twentieth than of the previous century. Why they leave home and kindred and how they come are not considered here. Come they do like sheep, and the majority without a guiding shepherd, turned loose by the hundreds of thousands in a continent, once a rich store house abounding in natural resources which our forefathers deemed to be unlimited and which we, in our greed for gain and wealth — reckoned by dollars and cents, have ruthlessly despoiled and destroyed and in some instances nearly annihilated.

We have in the past wisely encouraged and fostered this seeking of homes on this continent by the people of Europe, but it cannot be said we have done it well.

In the development of the natural resources by the extension of trade and commerce, we have not only been killing the goose that lays the golden egg, but we have permitted to grow up around us in our cities, towns and even rural districts, conditions which

have gradually tended to the detriment of those we have encouraged to come here, as also to our own kith and kin.

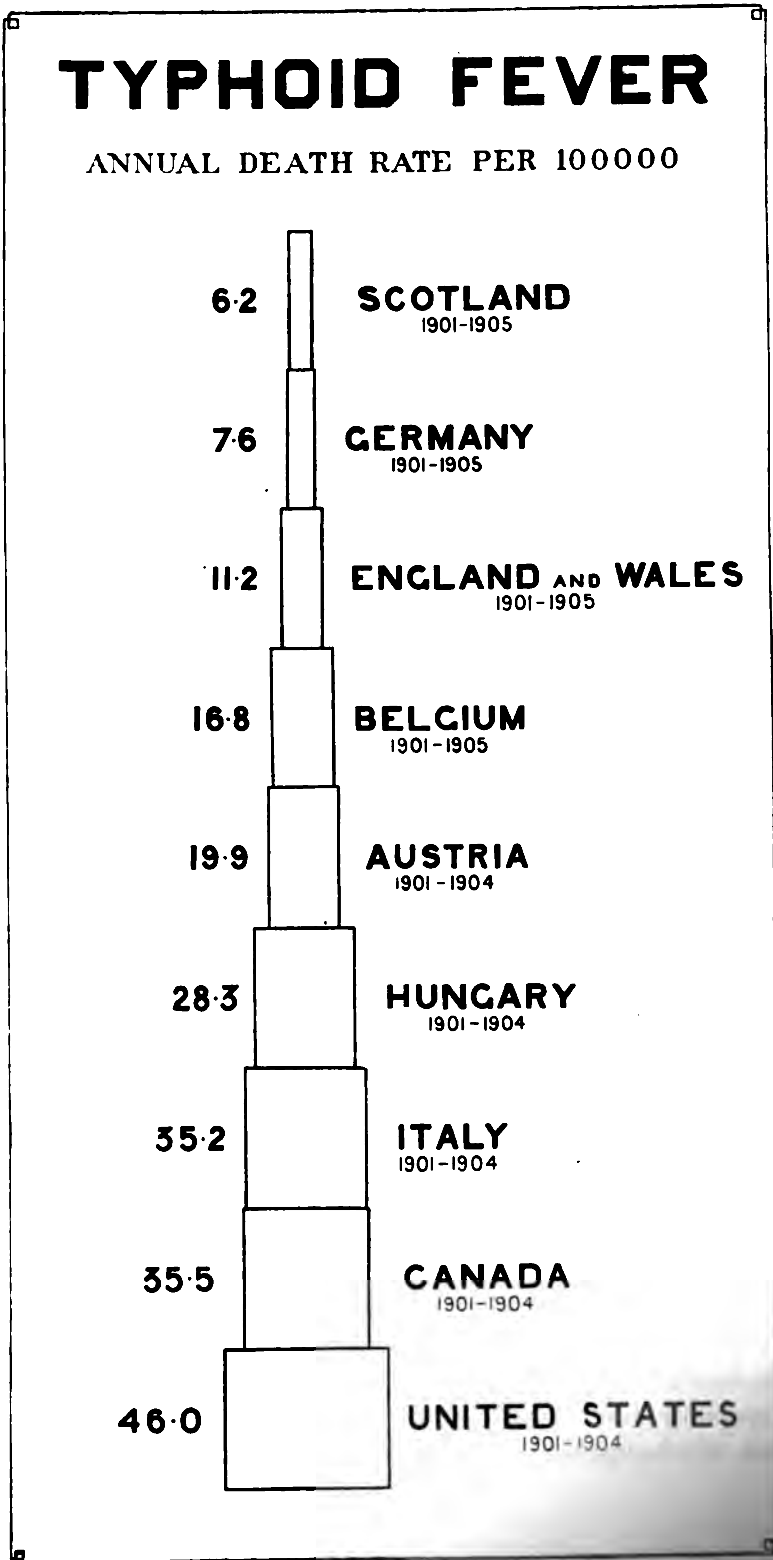
While seeking for temporal wealth, we have forgotten the importance of health, and as a result, some few have got the wealth while the multitude of toiling millions have what results from the neglect of the enforcement of the laws of health, viz. sickness, disease and death, with all that the mind can associate therewith.

For who can say that we in America are to-day, with all our boasted advantages, one whit better in the important matter of public health than are some of the countries from which have come large numbers of our present citizens? The figures are against us. The results of all our efforts as compared to those of some of the European countries are against us.

Take one concrete example — typhoid fever. What are the relative conditions in the United States and Canada, as compared to some of the European countries, as shown by the latest mortality records in the accompanying diagrammatic chart? When we consider that within the area represented by the group of states known as "the Atlantic" comprising 18 States of a total area of 430,723 square miles, with Iowa, Wisconsin, Illinois, and Arkansas, and Missouri thrown in; or, in Canada, represented by all the provinces as far west as Manitoba, there is crowded in no less than 178 million people, or twice the present population of both countries put together, the object lesson is made more prominent. The foreigners (as we are pleased to call them) have much better chance of living free from this dread disease by remaining at home than emigrating to this continent. This should not be — indeed would not be if we had been wise and provided proper health laws and enforced them years ago. And what applies to typhoid fever conditions applies with similar force to tuberculosis and many of the other evils, sanitary and social, which we have permitted to grow up with us and which surround us to-day on every hand.

Have we not, as sanitarians, been striving at the gnats of public health work and permitting the people, young, middle-aged and old, to be swallowed up by the camels?

We have now come to the time of a national stocktaking, and fortunately, man has been counted into the national balance sheet


TYPHOID FEVER
ANNUAL DEATH RATE PER 100000
6·2
SCOTLAND
1901-1905
7·6
GERMANY
1901-1905
11·2
ENGLAND AND WALES
1901-1905
16·8
BELGIUM
1901-1905
19·9
AUSTRIA
1901 - 1904
28·3
HUNGARY
1901 - 1904
35·2
ITALY
1901-1904
35·5
CANADA
1901-1904
46·0
UNITED STATES
1901-1904

— and certainly it is high time he should be considered as a national asset. He has been played with long enough, put off by a public health act, now, in many instances, old and musty and as much out of date as the old fashioned stage coach, when compared with the electrical means of locomotion now at our command.

Did ever a Minister of Agriculture stop in his efforts in improvement of all that appertains to our farming wealth by the passing of an Animal Contagious Diseases Act? No, he has gone ahead, spent thousands upon thousands in research work, in experimental work, in educational work of all kinds with the earnest hope of getting the best out of what nature has given man to toil, cultivate and develop.

Not so with man. Legislatures have required his education along lines of mental development, until to-day it would appear that some of our children must be mental monstrosities if they are to be what some of the educationalists would have them — in other words, physical wrecks, derelict before they are launched on the ocean of life.

The results of the shortcomings and mistakes of the past are not hard to find; they are apparent on every hand in city, town and countryside. Some of these mistakes have been framed in costly asylums for the insane, in massive prisons, in institutions for the deaf and the blind and in the still more recent addition to the already expensive gallery of misapplied national and State shortcomings — the sanatoria and hospitals for consumptives.

We can sadly reflect over the errors of the past. We can see now "what might have been" had we been wise and taken counsel from the experience of our elders. But in the lamenting let us be spurred on to activities hitherto unthought of and do the right as nations, lest we fall into the sin of omission, which will in the long run, prove more heinous than the sin of commission.

If the public of any nation could hope to conserve the lives and the health of its inhabitants by asking those entrusted with its government to maintain an army and navy for the preservation of the health of the people and the prolongation of their lives against apparently insurmountable and often unforeseen but relentless foes which, up to the present time, have been unvanquished —

perhaps there would be some hope of an early, successful and generous response. But the armaments asked for are of quite a different character; and we as sanitarians, know if the aid asked for is but given that a national victory will be assured. And following in the wake of the victory there will be no dark tales of woe, horror and desolation to be recounted; there will be no tears of the sorrowing for the vacant places in the homes of our country, no funeral biers, no call for the payment of pensions to the heirs of fallen comrades, even to the fourth or fifth generation; no colossal, national debt to be faced with a diminished nation of workers and blighted commercial conditions to make good the dollars and cents. No, we have quite the reverse to offer — a nation being daily blessed, while the battles with disease are being fought, sickness and death prevented, sorrowing, suffering, penury and crime lessened; the babe spared to its mother and the mother prolonging the life of the babe; the laborer giving better service to his employer by reason of improved health, and the employers bettering the condition of their employees, because it is right and proper. The body corporate acting in the interests of the tax-payers, carrying on works having for their object the improvement of the environment of the city, town and rural dweller. The State providing the trained men — the rehabilitated medical officer of health — now no longer a general practitioner of medicine and dependent on the public for his livelihood, but the State officer of preventive medicine. Not that the curative side of medicine will be abolished, but the curative will be made secondary to preventive medicine, the practice being along the lines of therapy, somewhat different to those now followed. This class of practitioner will be aided by the State providing biological therapeutic remedies which will be necessary, and possibly in other ways.

The national governments will be training or directing the education of the preventive forces, keeping the ranks provided with properly educated men, many of them trained it may be in a national school with well equipped laboratories for the carrying on of research work for the study of disease, both as to cause, prevention and cure.

This is conservation, and surely no higher, no nobler work was

ever suggested by mortal man in the interests of his country and his people. It is the essence of Christianity — the truest ideal of statesmanship — and the perfection of citizenship; and if properly carried out will prove of the greatest blessing to the nations engaging therein.

The suggestion of the conservation of natural resources upon this continent was made by Col. Theodore Roosevelt, while President of the United States, and was actively taken up in Canada by Hon. Clifford Sifton, subsequently appointed first chairman of the Commission. In 1909 the House of Commons of Canada passed an act creating the Commission of Conservation, which act was further enlarged and amended in 1910.

The following is a brief outline of the character, personnel, duties and functions of the Commission, as outlined by the chairman in his inaugural address.

As constituted, the Commission consists of twenty members appointed by the Governor in council, and at least one so appointed from each province shall be a member of the faculty of a university within such province. The ex-officio members are "The Minister of Agriculture, the Minister of the Interior, the Minister of Mines of the Federal Government and the member of each provincial government who is charged with the administration of the natural resources of such province."

The chairman is the administrative head of the Commission, and directs the work of the permanent officers.

Under section 9 of the act, no fees or emoluments of any kind can be received by the chairman or the members.

In regard to the duties of the Commission, these cannot be more tersely stated than as set forth in section 10 of the act:

> "It shall be the duty of the Commission to take into consideration all questions which may be brought to its notice relating to the conservation and better utilization of the natural resources of Canada, to make such inventories, collect and disseminate such information, conduct such investigations inside and outside of Canada, and frame such recommendations as seem conducive to the accomplishment of that end."

For working expenses, Parliament sets apart the sum of fifty thousand dollars, and now the work is actively going on.

That the master mind of the movement in Canada was fully seized with the value of human life as a national asset was evident, for in his inaugural address, Mr. Sifton spoke in regard to public health as follows:

"The Dominion spends hundreds of thousands of dollars in eradicating the diseases of animals, and the work, it is pleasing to know, is being done with thoroughness. But no similar effort is made by Province or Dominion to meet the ravages of diseases among human beings, such as tuberculosis. * * * It is probable that Parliament would readily consent to the necessary appropriation for undertaking to deal with the evil. This, however, is one of the subjects upon which Federal and Provincial jurisdictions overlap, and in which any effective action will require to be carefully worked out and agreed to between all the Governments concerned. A sub-committee from this Commission, representing, as it does, all the Governments, might well be able to work out an acceptable and useful plan which would receive general assent."

No doubt as a result of this, one of the committees of the Commission is that on Public Health, the chairman being Mr. E. B. Osler, M. P., Toronto. who takes a deep interest in the work.

The duties of the Commission are not in the least executive. They are simply advisory to the governments of Canada. This was clearly set forth by the Hon. Mr. Sifton in his opening address, as follows:

"The Commission, it is to be noted, is exceptional in its character.

"First, it is not a portion of the ordinary governmental administration for which the Government is politically responsible. It is a Commission created by Parliament and entrusted with certain duties, upon the performance of which it is to report from time to time. The funds necessary for carrying on the work, must, it is true, be procured by application to the Government of the day, which will introduce the necessary estimates; but, otherwise, the work is totally independent of the ordinary administration of affairs.

"The Commission is not an executive or an administrative body. It has no executive or administrative powers. Its constitution gives it power to take into consideration every subject which may be regarded by its members as related to the conservation of natural resources, but the results of that consideration

are advisory only. In a sentence, the Commission is a body constituted for the purpose of collecting exact information, deliberating upon, digesting and assimilating this information so as to render it of practical benefit to the country, and for the purpose of advising upon all question of policy that may arise in reference to the actual administration of natural resources where the question of their effective conservation and economical use is concerned.

"The effectiveness of our work will depend upon its own merits. We can only study, investigate and advise. The Governments concerned must take the responsibility of accepting or rejecting what we recommend."

As an initiatory step in the work, a Conference was held in Ottawa, October 12th and 13th, of the officers of the Dominion government now engaged in public health work and the health officers of the several provinces. The findings of the Conference were summed up in four resolutions, which findings will be considered by the Commission, and it is expected will be subsequently acted upon.

The importance of the subjects discussed and the decisions arrived at by the Conference are of great national importance in themselves, but the fact that the Conference will be continued annually is of still greater moment, for it opens up an avenue which can be made of inestimable value in the shaping of federal and provincial health laws and the co-ordination of the same.

It will at once be seen that the relationship of public health to the conservation movement, in Canada at least, is of the closest character; indeed, it is an integral part of the work of the Commission. This being the case, it comes at once in touch with the people in their daily life—the individual and his environment.

First, the individual; during his prenatal existence; his birth; his rearing; his school life; all through youth, manhood and womanhood, until he shuffles off this mortal coil.

Second, his environment (in its broadest sense); the home; the school; the workshop and office; and his amusements, exercises and sports.

It has to do with the health of the various groups of individuals, such as we find them massed together in either cities, towns

and villages, and in the more widely scattered groups of townships or districts.

It has to do with the greater geographical groups of our people as provinces, dealing with them through their lawmakers, the legislatures.

It has to do with the people of the Dominion of Canada, advising the Senate and the House of Commons upon the larger matters, those of national importance which can only be dealt with by a federal government.

The movement deals with questions which come home to each individual and these questions are of as great import, indeed greater import than the building of a railway, the extension of the fire department, or any of the many matters which are dealt with either by the municipal council, the legislature or the federal government, and in each of which he now takes more or less interest by recording his vote in favor of this or that particular candidate seeking his suffrage. Once convince the individual that the prevention of disease and suffering can be brought about to the improvement of the health of his wife and family and to the community in which he dwells, and when you have done this by the wholesale there need be no fear for the future. For legislatures will enact the proper laws and provide the necessary funds for the carrying on of the work in just the manner as they have for the care of the cattle and hogs of the country; for they will then have realized the truth of the motto in the MONTHLY BULLETIN of your State that "The first wealth is health."

The question of health is superior to that of politics. It is one of statesmanship, and if we have not the men in public life to-day who will rise above partyism, and in their representative capacity, whether in a council, a legislature or federal government, pronounce unequivocally for sound and rational laws for the prevention of disease and the conservation of the lives of the people, then it is your duty and mine to educate the public as to the necessities of the case, and while educating, to work with all our energies for the early consummation of what we desire.

In conclusion, to follow the example of the model man, I would figuratively set a child in your midst and seriously ask what are the two nations doing for that which is our best, our most precious national asset?

The answer will doubtless be made, we are providing for the child's education — true — but is that all? Is that enough? What of the years which elapse from its birth until the little child reaches the age when the State steps into the home and claims a say in its life's career? For these are the years of the greatest import to the physical condition of the child,— yea, even of the very life itself.

Do we as nations take the interest in the child that we should? Many of us neglect even to record its birth, although states, provinces and national governments carefully register in well kept stock books the births of hogs, sheep and cattle, and furnish pedigrees as elaborate as those attached to a royal potentate.

What of our milk supply which is the staple food of infants — what of the housing conditions and home sanitation? Are the environments of the homes of the town, city and country child what they should be? Let the nations improve these and they will save the lives of millions of little children who die before they reach the school room door. The land beyond the great divide is too full of babies and little children — an eternal monument to the sinful ignorance of mankind, while our cemeteries are overloaded and the ground encumbered with infants' remains, and yet we keep on in the extension and elaboration of these useless appendages of our socalled high class civilization. We must as nations cherish and care for the children, conserve them in our own interests by the introduction and the careful enforcement of municipal, state and national health laws of a sound, practical character. The task is great and ideal, but it is not beyond attainment.

THE CHAIRMAN — Dr. Hodgetts, in thanking you on behalf of the State Department of Health, I want to express the wish that these able words so rapidly spoken might be put in the hands of every citizen of the United States and Canada who might be able to read and digest them.

It seems to me, ladies and gentlemen, as if such an appeal, so forcibly put, should arouse in heart and mind of each of us a determination to wage a constant warfare of extermination on those diseases which are yearly destroying so much valuable life.

Those of us here who are so closely associated with this tremendous work of public sanitation feel at times as if we could hardly hold ourselves when we see child after child, and man after man, and woman after woman stricken down by conditions which are preventable, and which should be prevented. And that condition will prevail, my friends, until the time comes when you and you (indicating) and you and I and all the rest of us, and all our neighbors, every man and woman on this great continent unite in that great war of extermination of disease. And the time is coming; and we are bound to win in this great fight for the life of humanity.

As I sat and listened to that graphic word picture I could feel my tempera-

ture rise as I sat there; and I only wished that I could be given a new lease of life. I felt as if I would like to live 100 years hence to join hands with others in this grand fight for the existence of the human race, and I want to congratulate you, doctor, on the magnificent address you have brought to us, and as a citizen of this country and of this State, I want to promise you that as long as my life shall be spared I am in this fight for the life of the people of this State and country.

It matters not to me whether my friend is democrat or republican, or Canadian or English, or what-not, I want to place my hands of approval on him when he is engaged on this magnificent war of extermination of disease.

I am not supposed to be a speaker this evening, but when I listened to such thoughts as we heard, I felt as if I wanted to say "Amen" at every second or third sentence.

Now, we have another man with us to-night, a man of the same blood and flesh, and he, too, has done things, not in Canada, but right here in our own State, and in this beautiful city of Buffalo; and it is to his efforts more than to any other man who has labored on such lines in years that is due much of the credit for the magnificent results already accomplished.

It is with particular pleasure that I present to you the next speaker of the evening, Colonel Ward, who will address you on "Public Health and the Public Purse," which is indeed a timely topic.

PUBLIC HEALTH AND THE PUBLIC PURSE

By Col. Francis G. Ward,
Commissioner of Public Works, Buffalo

My remarks must necessarily be confined to practically the subject of sanitation in construction, the accomplishment of such engineering projects as the financial possibilities of the city of Buffalo would permit.

In the city of Buffalo, by its charter, the board of health is composed of his honor the mayor, the health commissioner and the commissioner of public works, a wise provision of the charter, which thus combines the chief executive, chief medical officer and the chief of construction in the service of the department of health.

The powers granted this board are paramount in case of emergency or epidemic. To-day, no greater question confronts our people than that of solving the problem of a successful form of city government in all of its branches.

Each of our large cities has gathered within its limits many people of all nations with every attribute of the different races. To formulate the best system of governing these, with consideration for the greatest good for the greatest number, is one of the problems involved.

We have no sure precedent by which we can be guided in covering ideal methods of city government. Modern inventions have done much in bringing these conditions about. We have been pioneers in a new field; we have made mistakes, and we have profited by them, and with an honest united effort we shall secure the ideal method of administering the affairs of our great municipalities.

Mr. Brice, years ago, in writing of our cities even then concluded:

"No one who studies the municipal history of the last decade will doubt that things are better than they were twenty years ago. The newer frames of government are an improvement on the older. Rogues are less audacious. Good citizens are more active. Party spirit is less and less permitted to dominate and pervert municipal politics."

Running a city is a complex business proposition calling for competent men.

With the question of cost of sanitation entering into every branch of the city's service, the latest practice and best methods are sought to reduce the maintenance with a rational installation.

From the collection and disposal of city waste, cleaning of streets, pavements, lighting of streets, to sewage disposal and water supply, every effort is made to give the best sanitary service at the lowest cost, recovering at the same time all by-products that can be disposed of.

As the form of and systems by which municipal charters are created and operated under, vary materially in this country, it is difficult to obtain satisfactory comparisons of cost between cities without close study of each and every service, local conditions rightly governing to a large extent.

The ideal engineering plan frequently must give way to the available financial resource.

Undoubtedly the general public services most closely allied to the question of public health are the collection and disposal of city waste and water supply; but their relative value to the inhabitants of a city is perhaps in the inverse of the order as named.

The collection and disposal of ashes, refuse and garbage follows the introduction of water and sewers.

Situated as Buffalo is, Lake Erie furnishes an ideal supply from the new or Horse-Shoe reef intake 330 days in the year. Periods of possible minor contaminations exist only during the period of storms in the early spring and late fall, when the whole body of water is disturbed.

The Health Department makes a bacteriological examination daily, and the city chemist a chemical examination weekly. The examination shows from 200 and 420 bacteria per c.c. to 800 normally, to 1,200 and 1,400 in the stormy season.

The city of Buffalo purchased the water works plant in 1867 for the sum of $705,000; to-day its inventory shows $12,500,000 in value, with bonds outstanding, $7,500,000; and a corporati[illegible] surplus account of $5,000,000. Of the bond issue $5,000,000 [illegible] been issued in the last three years for the building of the new [illegible] take and tunnel and new pumping station at the foot of [illegible] avenue.

The water bureau finances itself for this $5,000,000 issue by the payment from its receipts annually into a sinking fund for fifty years the sum of $860.50 per $100,000 of bonds issued; which sum compounded at 3 per cent. per annum will provide sufficient funds to retire the bonds when due.

The water rates in Buffalo are as low, if not the lowest, in this country.

Buffalo is undoubtedly the largest user of water per capita in this country. This is of no benefit except possibly the dilution of its sewage and cleansing of its sewers. The city is not metered, having only 2,500 meters in service, less than 4 per cent. of the taps. The department as an engineering and economic proposition recommends meters, but public opinion has at all times been naturally adverse to them.

Unfortunately the man who dares to propose anything, even though it be a great benefit to the populace of the city, that requires a great expenditure of money, is considered a man who is endeavoring to inaugurate something that will penetrate far into the future for the purpose of bettering solely his own condition, financially or politically.

Buffalo has met the requirements of a proper water supply.

Up to 1885 the city of Buffalo followed no definite policy as to its sewer system, and naturally districts became congested at their outlets.

In 1885 by act of the Legislature, the Trunk Sewer Commission was created. The Swan and Genesee street intercepting trunk sewers were constructed, and with their various extensions and laterals have cost the general fund of the city $2,246,922.75. Taken with the 500 miles of district sewers paid for by assessment on property benefited, amounting to $9,100,000, grand total of 507 miles of sewer system is $11,346,922.75.

The average system in the city of Buffalo is the "combined," carrying both surface drainage and dry weather flow.

To-day it is necessary for the city to provide again for the future in the construction of new and enlarged intercepting trunks with proper sedimentation, screening and purifying basins.

This improvement is variously estimated to cost according to the scale of work to be done at from three to five millions of dollars.

Collection of ashes, refuse and garbage: The three separations are maintained in collection and disposal. This service is rendered by contractors except the disposal of refuse.

Ashes are collected from all buildings where produced from heating service, and are disposed of by the contractor for foundations or fills.

Garbage is collected and hauled to a reduction plant outside of the city limits owned by the contractor where it is reduced to grease and fertilizer.

Refuse is hauled to the city refuse utilization plant, where it is all handled over a traveling belt, and the valuable portion of the same recovered, the balance conveyed by belt to the refuse furnace and destroyed by incineration.

The financial statement for the three years' experience to July 1, 1910, is as follows:

BALANCE SHEET OF REFUSE UTILIZATION PLANT, JULY 1, 1910

	Dr.	Cr.	Loss.	Gain.	Assets.	Liabilities
Capital — Furnished by city of Buffalo.		$50,000 00				$50,000 00
Plant	$50,000 00				$50,000 00	
Sales		97,316 91		$97,316 91		
Steam power		8,985 21		8,985 21		
Supplies, maintenance and repairs	19,802 26		$19,802 26			
Supplies, new equipment	3,606 00				3,606 00	
Interest	4,000 00		4,000 00			
Payroll	73,019 45		73,019 45			
Insurance		200 00		200 00		
Accounts receivable	2,633 80				2,633 80	
Balance with city treasurer	3,440 61				3,440 61	
Accrued interest			1,600 00			1,600 00
Gain			8,080 41			
Surplus						8,080 41
	$156,502 12	$156,502 12	$106,502 12	$106,502 12	$59,680 41	$59,680 41

The largest source of revenue is from mixed papers and newspapers sold to paper board mills. Then tin cans, bottles, metals, rubber and leather.

Of all the refuse collected and hauled to the plant 40 to 50 per cent. is susceptible of recovery and sale.

The city is now constructing new furnaces which will destroy the garbage in its cells, and save the expensive haul of the same to the country reduction plant. This saving is $1 per ton.

The garbage disposal plant (incineration) may be made absolutely sanitary, may be made to pay its way in disposal of the city's waste, and at the same time be one of the greatest examples of municipal conservation.

I will now read to you a statement or report of our refuse utilization plant for the fiscal year ending June 30, 1910:

Expense of pay roll, $28,838.75; maintenance and repairs, $6,085.85; interest on bonds, $50,000; cost of plant, new equipment, $3,606; total of $38,530.

We sold 5,882 bales of newspaper, a total of 2,656,010 pounds, for which we received $10,020.39.

We sold 13,865 bales of mixed paper, a total of 6,438,950 pounds, for which we received $20,187.38.

Sold 1,121 bales of manilla paper, a total of 427,160 pounds, for which we received $2,880.23.

Sold 421 bales of rags, a total of 192,395 pounds, for which we received $1,121.98.

Sold 65 bales of flour bags, a total of 60,529 pounds, for which we received $580.43.

Sold 58 bales of charcoal bags, a total of 16,895 pounds, for which we received $159.69.

Sold 13 car tins, a total of 256,450 pounds, for which we received $503.90.

Sold 60,670 pounds of scrap iron, for which we received $60.

Sold some old rubbers, etc., for which we received $65.

Sold 19,552 beer bottles, which brought in $195.52.

Sold 1,964 mixed bottles, for which we received $530.94.

Sold 967 half-gallon bottles, for which we received $19.34.

Sold 4,453 ammonia bottles, for which we received $22.28.

Sold broken glass — 20,000 pounds of it — for which we received $20.

Ten bales of old shoes, a total of 8,270 pounds, for which we received $28.16. Making a total of the entire list of $36,395.24, less deductions for moisture, etc., which amounted to $21.90, or a total of $36,373. Steam furnished Hamburg Pumping Station, 4,003¾ hours, at 70 cents, or $2,802, or a net total of $39,175 actually received.

This is the first plant of this nature operated on this system. The steam generated is used to pump sewage from low level to trunk sewer.

The services just enumerated are those that relate most closely to the sanitary department, but Buffalo can well be proud of her miles of streets and pavements, for on January 1, 1909 (exclusive of park system), there were 234 miles of asphalt; 22 miles of brick; 13 miles of macadam; 15 miles of block stone; 80 miles of second class stone, a total of 364 miles of paved streets.

The public purse, gentlemen, will be open at all times to the public official who gives definite results for the public funds expended.

THE CHAIRMAN — Colonel Ward, in thanking you for your instructive remarks, it seems that no better assurance of the interest taken could be expressed than the close attention which has been given to you by your hearers. I want to thank you, however, personally for the Commissioner of Health, as well as on behalf of myself and your audience.

The remainder of the evening will be given over to Dr. Fronczak, commissioner of health of this city, who will display some lantern slides which you will find instructive and interesting.

(Dr. Fronczak exhibited a number of lantern slides, at the conclusion of which the meeting adjourned until Thursday, November 17, 1910, at 10 a. m.)

THURSDAY, NOVEMBER 17, 10 A. M.

FOURTH SESSION

SECTIONAL MEETINGS—CITY HEALTH OFFICERS

Chairman: FRANCIS E. FRONCZAK, M. D., Health Commissioner of Buffalo.

DR. FRONCZAK — Gentlemen, I have been delegated by the State Commissioner of Health to act as the chairman of the city health officers and before we proceed with the program I desire to read the following letter which I received this morning:

On behalf of the Entertainment Committee of the University Club of this City, I write to ask that you extend to the members of the Sanitary Officers Association and its guests the freedom of the University Club during their stay in this city. We should be glad to have all those in attendance at the convention avail themselves of the privileges of our Club while they are here.

Yours very truly,

LOUIS B. BOTSFORD

This club is now at the corner of Delaware avenue and Allen street. They have plunges, bowling alleys and other things pertaining to such clubs and you are invited to avail yourself of these privileges.

The first paper of the morning is by Dr. P. M. Hall, the health officer of the city of Minneapolis, on "Garbage Disposal."

THE TEN COMMANDMENTS FOR HANDLING GARBAGE WITHOUT NUISANCE

BY P. M. HALL, M.D.

Commissioner of Health, Minneapolis, Minn.

From the earliest time animal and vegetable waste commonly called "garbage" has been considered a nuisance — a nuisance to be gotten rid of as a sanitary necessity. The stuff itself was a nuisance and became more of a nuisance the longer it was kept around. Desire to get rid of it, to get it out of the way, if not out of sight, was the first and most natural impulse.

The methods of garbage disposal have progressed from dumping on land and at sea, to pig-feeding, then to reduction with utilization, and finally to incineration with utilization. No thought

was given at first as to how it should be gotten rid of, nor to sanitary methods. It was so foul that all effort was expended upon simply getting it out of the way.

When methods of disposal began to be evolved, they were considered generally as engineering problems — too much so, in fact, when they should have been and should be now the result of the combined wisdom of the engineer and the sanitarian. The engineer, who knew little about garbage, built the garbage disposal plant, and the health officer who knew less about engineering, operated it. Is it any wonder that in the course of time the health officer tired of the work, and the contract system came in? The demand of the contract system is that it get the material and the more the better — anything to increase the tonnage. Little care is taken regarding the necessary sanitary steps from kitchen to can, from can to wagon, and from wagon to disposal plant. The question of sanitary handling is certainly of as much importance as final disposal. Why prate about internal temperatures and noxious gases at the disposal plant, when the heat of summer and improper handling of the garbage can make a nuisance around thousands of homes? The indictment against the garbage can, in the average city, is that it is a foul, maggoty mess of putrefaction and a fly-breeder, and it stands self-convicted on both counts. Putrefaction arises from the decomposition of animal and vegetable matter. "It is the result of the activity of certain organisms. It can, therefore, only take place when the conditions are favorable for the life and growth of these organisms. A temperature of from 60 to 80 degrees Fahrenheit, a moderate degree of humidity, and limited access of air, are the conditions most favorable to putrefaction." All of these conditions exist in the garbage can as usually kept.

Animal and vegetable matter attracts flies, and then what follows? We need not ask the naturalist. Any intelligent, observing housewife will tell you that she has seen "germs" in her garbage can. Garbage disposal should begin at the kitchen and end in the ash-pile. Why not begin at the kitchen, then, to retard putrefaction and eliminate the fly? How?

Drain garbage of all moisture, then wrap it in paper before putting it in the can, and it will neither smell badly in hot

weather, nor freeze and stick to the can in cold weather. Do this and have a clean can at all times.

Heat, moisture and the fly, are all eliminated. There is plenty of air space between the packages of wrapped garbage, and the conditions favoring putrefaction are removed. Bearing in mind the same conditions that favor putrefaction, the can should be free from holes, and have an over-lapping self-locking cover. Now that you have the garbage drained of moisture and wrapped in paper, keep it protected from heat, moisture and the fly. With this end in view, and governing each step of the process, the garbage goes on to final disposal.

The garbage wagon-box should be so constructed that it can be lifted off the truck. There should be no unnecessary handling. There should be no dumping of the load excepting directly into the hopper for final disposal. From the picking up of the can at the rear of the house, until the residue of fine ash is taken from the ash-pit at the disposal plant, there should be no handling by hand.

For three and one-half years the city of Minneapolis has been handling garbage in this way, and it is without nuisance at the can, in the wagon, upon the street, or at the disposal plant. The garbage is first drained of moisture and wrapped in paper, then placed in the can. The paper used is that brought by the grocer, the butcher and the baker with their wares. The garbage is thus reduced in bulk and putrefaction so much retarded that collections of once a week are often enough, even during the summer — a great saving in the cost of collection.

The garbage is collected in steel tanks of 100 cubic feet capacity and hauled to a central transfer station, where the tanks are lifted off the wagon truck by means of an electric hoist and placed upon flat cars for transportation to the disposal plant. At the plant the boxes are lifted from the cars by a three motor electric hoist. This permits of handling the boxes in mid-air and dumping them directly into the fire. No garbage is dumped upon a platform, conveyor or floor, or any part of the building, but directly through the hopper into the fire. There is no garbage anywhere about the building excepting that in the garbage boxes or upon the fire.

Through the burning of the garbage we are able to produce

enough steam to operate all of our machinery, and to heat and light the group of workhouse buildings, the superintendent's house, the tuberculosis hospital, and the two green-houses. It is the intention of the city to place near the crematory, all of the infectious disease hospitals, that they may be heated and lighted in the same way.* One of these hospitals of 130 beds, for advanced tuberculosis, is already under construction. This service of heat and light is furnished to the city at a cost of 8 mills per horse-power (equivalent to 30 pounds of water evaporated) for heat, and 3 cents per kilowatt for light.

We have thus been able to handle garbage without nuisance from kitchen to ash-pile, and to do something in the way of utilization besides. This method of handling garbage has been a growth. The objects sought have been entire absence of nuisance at every step of the process and economy of operation. The rule regarding draining of moisture and wrapping in paper was carefully thought out and when adopted, rigidly adhered to, until now, the people seeing the benefits of the "cleaner way" cheerfully comply.

At the disposal plant, garbage was first delivered to the incinerators by means of a conveyor, but this was abandoned as being a nuisance and insanitary, and the present clean method of over-head dumping directly into the fires was substituted. The cost of collection and disposal has been very low. For the year 1909, the per capita cost to the citizens of Minneapolis was 19 5-6 cents. This figure also includes the cost of collecting and handling ashes, and represents the gross cost without deducting anything for the service of heat and light. Estimates based upon tonnage are usually unreliable, but the total expenditure for such service is easily obtainable, and the per capita cost is consequently more accurate.

The recapitulation has been put into the form of

"THE TEN COMMANDMENTS FOR HANDLING GARBAGE WITHOUT NUISANCE."

I. DRAIN-OUT MOISTURE!
Use detachable sinkstrainer.

* The best evidence I can give you that this crematory is not a nuisance is the fact that the city has placed these institutions around this plant.

II. WRAP IN PAPER!

Keeps garbage from heat and flies, prevents freezing and sticking to can in winter.

III. USE METALLIC CANS!

Non-corrosive metal, over-lap self-locking cover, and free from holes.

IV. USE PAINTED STEEL WAGON BOXES!

Constructed water-tight and to be mechanically dumped.

V. NO DUMPING ON FLOORS!

Box mechanically elevated, and contents emptied into incinerator hopper without nuisance.

VI. IN-DRAUGHT AT HOPPER!

Prevents escaping smoke and odors.

VII. MECHANICALLY CHARGED INCINERATORS!

Eliminates the nuisance of exposed garbage and the emanation of foul odors.

VIII. GOOD DRAUGHT!

Creates rapid combustion and high temperature, burning everything of obnoxious nature.

IX. NO RESIDUE LEFT OVER!

Nothing to make a nuisance around the plant — nothing left but ashes.

X. GENERATE STEAM!

For self-operation and sell surplus heat, light and power to make plant self-sustaining.

The movement for cleaner cities, cleaner methods, has but just begun. The campaign for pure water, pure milk, for dustless homes, for well-ventilated schools, is a popular one. Sanitation is but education and the people are learning. In the handling of garbage and city waste, can we longer afford to tolerate anything but the cleaner, better way?

DR. FRONCZAK — Gentlemen, we have heard a very interesting paper and I have to compliment Dr. Hall, for he covered the subject very thoroughly. The discussion of the paper will be opened by Dr. William D. Peckham of Utica.

DR. PECKHAM — Mr. Chairman and gentlemen — The question of the proper collection and disposal of garbage is one that may give a city health department very much trouble. In Utica our main trouble [illegible] con-tractor who collects the garbage up to the [illegible] hire is naturally of a not very high, [illegible]

usually are daily failures to collect reported to our office. The contract which we have with the garbage collector allows the health officer to impose a fine of two dollars for failure and this it has been necessary to impose several times. Just at present we have him so afraid of the wrath to come that he will call the office up two or three times a day to find out what failures have been reported.

Our garbage disposal plant is a reduction plant and is run in connection with the fertilizer plant, which has a capacity of about thirty-six tons daily. There is no waste — nothing that will create a nuisance from the garbage after it is put into the digestors. After it is taken out of there it is put in the hydraulic press. The remnant is run into the condenser and used in fertilizer so that the only waste is steam.

One thing that impressed me very much in Dr. Hall's paper was the direct dumping into the tanks, because at our plant it is rather a roundabout way from the wagon to the digestor, so that really there is a little garbage always around the plant.

DR. F. S. SWAIN, Corning — I would like to ask Dr. Hall how the cans are kept clean. What procedure or process they have for that purpose?

DR. HALL — You follow the rules about draining your garbage and wrapping the garbage in paper and the cans will keep themselves clean.

DR. F. J. MANN, Poughkeepsie — I would like to ask Dr. Hall about the self-locking device. What is that?

DR. HALL — There is a little slot on the side of the can with a contrivance I cannot describe exactly on the lower part of the cover so that when the cover is put on the can and turned it locks itself so that it is not easily blown off and cannot be pushed off by dogs. That can is on the market.

DR. F. S. SWAIN — If I may be permitted to say a word or two on this garbage matter. Dr. Hall's plan is, no doubt, an excellent one for cities of large population, and perhaps would be very efficacious in the smaller places. However, it seems to me that in the cities of fifteen or twenty thousand it would be quite an expensive way. In my home city we have adopted a garbage plan this year which is on a line as follows: We have let a contract for the collection of garbage to be done under the direction of the health department at least once a week, or oftener, if necessary. The can system is used. The cans are to be uniform in size, namely, thirteen inches at the bottom and fourteen inches at the top and twenty-four inches high covered with a tight cover. These cans are left, as I said, once a week, and each week the collector goes about with a wagon that will hold fifty-two cans. He leaves a clean can and takes the full one. That is taken to his garbage disposal place, which is upon a farm where he has facilities for washing and boiling the garbage which is fed to hogs. After the can is emptied it is cleansed and disinfected, ready for use again. The cost to the consumer is this: they deposit $2 per can for a use of five years and they pay ten cents per week for collecting that garbage. Therefore it costs really — the city in a direct way, nothing; the consumer, ten cents a week. He is sure of clean, wholesome cans, and the garbage emptying into the wagons in the street, a disgusting method, to my mind at least, is disposed of.

DR. LOUIS VAN HOESEN, Hudson — I have seen in Hudson the same experience Dr. Peckham has in Utica. The difficulty is to get the contractor to do his work which, he says, is not his fault, but on account of the nature of the work it is difficult to get reliable and ready people; but Dr. Swain gave us a very good remedy for some aspects of the case — that is the removal of the garbage in the original can. There is something I would like to have Dr. Swain explain. He says the cans are all of uniform size and the wagon will contain fifty-two. Now we have a number of hotels and also a number of large families who would fill the cans much oftener than once a week — possibly once a day. There would have to be other wagon trips. Then you would have families where the ten cents a week would be hard to collect. I would like to inquire who collects that.

DR. SWAIN — I would say that the health department has nothing whatever to do with the collection of the fees. The contract is let to the garbage collector for a very nominal sum, and where they have the larger quantities of garbage

they simply meet that situation by leaving more cans, or they can collect oftener if they want to.

DR. A. J. BENNETT, Lakewood — I would like to ask the gentleman from Utica, if it is not out of order, about how it would affect the people in the rural communities; the people in the country — would it not be endangering their health to some degree in dumping the garbage upon their land? We admit there are a greater number in proportion of people affected by dumping it upon the lands in the city. Carting it in the summer on a wagon away into the country a long distance, is it not just as right to demand that the health of the people in the rural communities be protected as well as it is in the cities?

It would seem to me that Dr. Hall of Minneapolis has given a solution of the whole problem.

DR. CHARLES O. GREEN, Hornell — The health board of Hornell have a system like Dr. Swain's at Corning. The trouble we have is with the citizens — to get them to put the garbage in the can. They claim they don't want to pay the ten cents or buy the can. We also have wagons that go and pick it up, and some of them feed it to swine, some plow it in on the farms. There are seven or eight that have a contract to collect this. But the greatest trouble we have is to get the people to put it in the cans and keep it covered up. The cans have to be clean when brought; when full, the can is taken away. If they need emptying more than once a week they have to come as often as necessary.

DR. HALL — Speaking of reduction plants, it is not true, as many suppose, that a reduction plant is barred from handling garbage wrapped in paper. I stopped yesterday at the Chicago reduction works and spent the day there. Mr. Turner, who is in charge of the plant, simply voiced his experiences, and they date and go back to that same garbage can. They cannot get the stuff in the winter time. The cans freeze up solid. They are obliged to go out to other parts of the country. He is making efforts now to go out by rail to get garbage in to keep their plant going. He welcomes this proposition of draining garbage of moisture and wrapping it in paper because it will give them the garbage in winter time. It is just as much of a nuisance in the city in the winter — just as much of a nuisance — because these same cans, frozen solid, remain there to thaw out in the spring. Now the can is just as clean at all times in the summer time as it is in the winter time. Wrapped in paper it will roll out just as easily in the winter as in the summer time. Another thing, it preserves the life of the can. We do not permit our drivers to use a crowbar or pick of any kind. If the contents are frozen the can is simply not taken and the family are required to thaw it out, and after they have done that once they learn. We employ just as many teams in the summer time as we do in the winter, so the solution of sanitary handling of garbage must go back to the condition of the can.

Another flaw in the reduction without the paper is this, whether it be in the large or small city: They have the three-barrel collection. Three-barrel collection means more money in the case of collection — garbage, rubbish, ashes. With the two-barrel system which we use, all rubbish — everything that will burn — goes in the garbage can, so that we have but two separations. Speaking about the cost of this service in Corning, as I understood the gentleman, that it cost ten cents per week per family. I want to say right here if there is ever a reform that is necessary it is for a city to get away from the contract system and do that work itself. It makes no difference whether a taxpayer pays it out of his pocket or indirectly in taxes; it comes out of his pocket just the same. Now this service costs the citizens of Minneapolis nineteen and five-sixths cents per capita per year, figuring the average family at four people.

DR. SWAIN — That is what it costs to collect the garbage?

DR. HALL — Collection and disposition.

DR. SWAIN — What did it cost you to erect the plant?

DR. HALL — Very little.

DR. SWAIN — That [illegible]

DR. HALL — I[illegible] dispose of 100 tons at the

present time. We have a capacity of 500 tons, so that the present plant will take care of the garbage of the city for a number of years. The plant cost, all told — with the machinery for operating the electric light and furnishing heat, less than $60,000. Now I say the contract system is against the municipal system. This costs — the collection and disposal (and if you notice in the paper I gave you, gentlemen, that it also includes ashes as well as garbage) costs the citizens of Minneapolis nineteen and five-sixths cents per capita — the average family being say four — it costs the family about seventy-seven cents per year as against $5.20. Now it makes no difference how he pays it, it comes out of his pocket just the same whether he pays it directly or, in the shape of taxes, indirectly.

Speaking of the question one of the gentlemen raised about the difficulty of getting the people to put the garbage into the cans. I supposed, of course, that every city had regulations that they could compel the citizens to do that, or at least arrest them for throwing it out.

I think I have covered all the questions that I noted down. If there are others, I will be glad to answer them while I am here.

DR. SWAIN — I don't wish the doctor to think I am objecting to the system in Minneapolis, but that system, to my mind, is not applicable to the smaller places. We are here for information. Now you say your plant cost in the neighborhood of $60,000. It costs nineteen cents approximately for a year for collection and disposal. Now does that include the cost of running your entire plant and —

DR. HALL — Running the entire collection system, the entire disposal system, and we do not deduct anything for what accrues to the department for heat and light. It was the gross cost. I said that the system of heating by the plant gave a credit last year of nearly $6,000. Now answering the question about the small cities. This is just where it does apply. Places like Edmonton, Duluth, Muncie, Ind.; Tampa, Fla., have all similar systems and they are all smaller towns and operating just as cheaply per capita as we are.

We don't allow any water emptied into our cans at all, so we don't have any freezing there. The garbage, as ordinarily collected, will contain from 75 to 80 per cent. of moisture.

DR. SWAIN — Do you find that the people will put the garbage into paper and you don't have to oblige them to?

DR. HALL — We find that they do, but we don't collect it if they don't. We refuse to take it and they are hauled into court and fined.

DR. SWAIN — What do you do with the garbage in the meantime?

DR. HALL — Make them haul it themselves and deliver it to us. It is simply adopting a system and adhering to it. It has worked out beautifully. At first they told us "it is a fad, out and out. You will want us to wrap it in paper and tie it in blue ribbon," but we have simply adhered to it and it has worked out perfectly.

DR. SWAIN — Where does your money come from for your collection?

Answer — Taxation.

Question — A revenue from the plant?

Answer — Right into the city treasury.

DR. SWAIN — Where do you get the revenue?

DR. HALL — We charge it up to the board of charities and correction, who operate these places.

Question — Do you get any products from the refuse?

Answer — No, only in the shape of steam for heating and lighting.

Question — No fertilizer or anything of that sort; simply a matter of destruction?

Answer — Yes, and to go a little further we utilize at the present time only about one-sixth of our power and get a revenue of about $6,000 a year. In other words, we can operate the plant with 600 horse-power where we are using 150.

DR. FRONCZAK — The next paper will be by Professor Charles Baskerville on "City Sanitation."

CITY SANITATION

By Charles Baskerville, Ph.D., F.C.S.,

Professor of Chemistry and Director of the Laboratory, College of the City of New York

Great cities have grown and passed out of existence. The enormous increase in urban population in very recent years has produced even greater cities, which may also in time cease to be. In fact, aside from the possibility of local or cosmic calamity, this is sure to occur, unless due attention is given to the application of the principles of chemistry in our daily, personal and communal life. London, Paris, Bombay, Rome, and New Orleans have had their scourges in the past to testify to the fearful penalty of ignorance and neglect.

Indications point to an urban growth and development, the conception of which taxes the imagination. When we see New York as it was 200 years ago, and then 100 years ago, and as it is now, we may well wonder what it may be fifty years from now. In fact, New York city to-day, which may be taken as an example, has as many people within its 326¾ square miles as are distributed over the States of Maine, Vermont and Massachusetts, combined, with their 47,070 square miles of territory, or were within the entire country at the end of the Revolutionary War. It has been calculated that in 1920, New York may have 7,000,000 of people. The growth of the smaller cities in the United States has been equally marked, but perhaps not so striking.

It has been predicted by a close and conservative student of sociology that two generations may see the eastern part of our country mainly composed of contiguous cities. In 1790, 3.3 per cent. of the population of the United States was urban. It was 33.1 per cent. in 1900. The problems of the state and county become closely interwoven with those of the city. The city will no longer be merely an accumulation of human beings in a particular locality, with its local problems and influencing the state mainly in a financial way, but the city will have become the state.

The individual needs fresh air, pure water, good food, safe

shelter, and should have a clean body and something beautiful to look at. When he associates himself into a city his needs are not lessened, but emphasized. The growth of a city causes it to assume, willingly or no, corresponding obligations. The inhabitants must breathe, they must be fed and watered, its wastes must be got rid of, facilities for the safe coming and going of its people at all times must be provided, as well as protection from fire or other adventitious circumstances which concern the welfare of the citizens. The needs thus simply stated are to be met by obligations which become more and more complex with the increase in population. In fact, most of the city's problems are of comparatively recent date.

With your permission I shall address my remarks to certain specific matters which have come under my observation in Greater New York, and to which I have given some special study. No doubt these matters have already been considered in some of your conferences, but the public expression of the independent point of view of one unhampered by official ties may serve one good purpose, namely, of provoking discussion, which can be made profitable.

The consideration of the *air* of cities involves not only the principles of ventilation, which will not be considered here, but the construction of the streets, means of transportation, the disposition of wastes, and the handling of the more unusual contaminants, which vary with conditions.

There are more than 2,000,000 miles of public roads in the United States outside of municipalities. These roads in many cases are essentially the same as we find in the outskirts of our larger cities, and are the roads of the smaller towns. The town roads are traveled very much more, so the actual facts at hand for the average road are applicable to the town roads for which no satisfactory data are available. Cushman has calculated that 500,000 tons of dust are raised on the public roads per day, or, taking 100 dry days in the year, 50,000,000 tons of material are taken by the movement of ordinary vehicles from places where it is needed and placed where it is undesirable. A discussion of economic principles of road conservation is not germane to our subject. Suffice it to say that the modern motor driven vehicle

is not a dust maker, but a dust raiser. "The dust problem did not begin with the introduction of the automobile, although it has undoubtedly been accentuated by this mode of travel. There are sections of our country at the present time where the roads have been rendered practically dustless, and neither horse-drawn vehicles nor automobiles can now deposit the dirt of the highways in the gardens and houses of abutting property owners. This condition of affairs did not exist before the introduction of the automobile, but has been arrived at in answer to the demand which has followed its use. In short, there are many suburban communities in which life to-day is far more agreeable, pleasurable and possible than it was before automobiles came into use.*" Why may we not have this in every city?

Aside from the personal discomfort from flying particles of solid material, whatever be its nature, these particles are the bacterial aeroplanes. Sedgwick has shown that ten liters of air taken five feet above a macadamized street in a dust storm may contain as many as 200,000 micro-organisms.

"There is a natural fouling of the street surface and an unnatural fouling. The natural comes from excrement from animals,† detritus from wear of pavements, soot and dust from the air, leaves from the shade trees, and the grindings from tires and shoes. The unnatural, or, rather, avoidable sources are: refuse thrown or swept upon the streets from buildings, refuse thrown by careless users and refuse spilled from vehicles carrying materials through the streets. The latter causes are supposed to be prevented by the operation of ordinances which are honored in the breach, and these causes result in the greater cost of cleaning,‡ as the sweeper has considerable work in collecting litter before attacking the dirt, and the material is bulky."

Commissioner Edwards says in *Municipal Chemistry* that

* Cushman, "*Municipal Chemistry*." McGraw-Hill Publishing Co.

† One thousand horses will, in every working day of eight hours, deposit about 500 gallons of urine and 10 tons of dung upon the pavements. "On the Utilization of Stable Waste," see Birchmore, *Journal of the Society of Chemical Industry*, 1900, vol. 19, p. 118.

‡ For cleaning all the boroughs in Greater New York of garbage, ashes, refuse and street sweepings the board of estimate and apportionment allowed an appropriation of $7,418,299.20 for 1909, and this amount was divided among the boroughs, Manhattan receiving $4,230,441.70; The Bronx, $560,371.30; Brooklyn, $2,492,481.20; and for general administration, $135,005.

"There are two general methods for disposing of street dirt; namely, it may be picked up, swept up, or shoveled up, and then hauled away, or it may be washed into sewers through the agency of water, or there may be a combination of these methods.* I may state that some of the papers I have mentioned are given in full in the work entitled "Municipal Chemistry," which I expected to have with me to-day, but it will be ready from the McGraw-Hill Press the first of December — treating in various discussions the different problems of how to keep a city clean and how to make it beautiful. As a rule, a considerable portion of the dirt is conducted away during rain storms, and some cities have especially constructed their sewers with the view of conducting off all dirt which can be reasonably emptied into them; in fact, it may be said that many municipal engineers consider that the sewerage system of a city should be constructed in such a way that it will carry off a large portion of the fine dirt from the streets."

I will go further and say that the streets should either be made dustless or wet down with dilute chlorine water, that is, a solution of bleaching powder or other disinfecting fluid. Both methods have been used with success and are within reasonable cost.

The topography of a district in which urban population has massed itself will, in a measure, regulate the mode of growth. Although improved methods of rapid transportation have overcome the *necessity* of concentration, yet business and other causes continue to make for centralization, with consequent elevation in the value of land, whose acreage is increased only by vertical expansion. The modern subway comes as a result. The air from the streets is sucked into these human mole holes. It is to be hoped that the Public Service Commissions will allow the construction of no more subways except that the tracks be separated by partitions, or that the tracks of trains going in opposite directions will be kept in different compartments. For, although much street air enters the tunnels in New York at present, a large portion of the air is simply churned by the passing trains and not quickly and properly replaced.

* Very, "*Municipal Chemistry*," McGraw-Hill Publishing Company. Vacuum street cleaners have so far proved too expensive.

There are many incidental impurities in city air that are local and more or less evanescent. I have shown that in the city of New York about thirteen hundred tons of sulphur dioxide are poured into the air daily in the combustion of coal. This is a sad annual economic waste of a most important chemical, some millions of dollars in value, which we do not know how to avoid at present.

The smoke problem has confronted every city where coal is used as the main fuel. Civilized nations are only beginning to awaken their "conscience of fuel." Our methods of utilizing coal give us a return of only 5 per cent. of its energy when burned, and only 1 per cent. when we convert that energy into electric light in the city.

Good firing is admittedly an important factor in smoke prevention, and it has even been regarded as the main factor of the problem; * but many authorities favor the distribution of gas as a means of at least alleviating the smoke nuisance.†

There have been many complaints against some of the railroads running out of New York City, because of the nuisance caused by their use of soft coal. Some of the suburban towns have taken legal action to prevent this. The solution of the smoke problem on the railroads reduces itself to the use of hard coal or oil fuel, as the application of mechanical stokers and smoke consuming devices to locomotive engines has not proved to be a success, or better still in electrification. The last is proceeding with gratifying speed.

The theory of Rayleigh‡ for dispelling fog, and with it smoke, by electrification is interesting and is demonstrable in a beautiful way on a laboratory scale, but the expense entailed and practical difficulties involved preclude its favorable consideration.

"One of the worst smoke nuisances about New York during the past few years has been caused by the garbage and other reduction plants at Barren Island.§ During this process of reduction, oil and grease are extracted from the animal and

* Caborne, *Jour. Roy. San. Inst.*, 27, p. 142.

† For example, Lodge, *Des Voeux*, A. J. Martin, and A. S. E. Ackerman; in this connection, see *Jour. Roy. San. Inst.*, 27, pp. 42, 64. 80, 85.

‡ *Jour. Roy. San. Inst.*, 29, p. 42; and *Elec. Rev.*, 47, p. 811.

§ Parsons, *Municipal Chemistry*, McGraw-Hill Publishing Company.

vegetable matter, leaving a dry residue, which is used as a base for the manufacture of commercial fertilizers, the discarded residue being burned in the plant as fuel.

"At another plant on this same point the carcasses of the larger dead animals, which are transported by a regular line of boats, are burned. When the immense number of carcasses ordered removed annually by the New York Department of Health is taken into account, it is not surprising that the smoke given off with the accompanying odors should give offense to residents for miles around. The number removed during the past year included 19,000 horses and about 380,000 dogs and cats, besides about 1,000,000 pounds of condemned meat, about 80,000 pounds of too "gamey" poultry, about 3,500,000 pounds of fish and about 5,000,000 pounds of offal." *

This nuisance is, of course, preventable by mechanical devices which bring about perfect combustion.

The necessity for a suitable supply of potable *drinking water* is now well recognized in every civilized community, and it is usually provided in the city, often at great expense, yet an appalling degree of ignorance is still encountered in the country districts that is difficult to overcome. A large percentage of urban population, and it is most desirable that every single individual in the city should, enjoy a few days or weeks in the country in the summer. The ignorance of country habits is proverbial with the urban citizen, who takes certain matters for granted. It is, therefore, not infrequent that these outings, picnics, etc., which should make for the better health, are the direct causes of unnecessary illnesses attributable directly to the drinking water, for all the liquid refreshments on these occasions are not limited to the national German beverage.

This is largely a matter of education. Every teacher of chemistry has a splendid opportunity to drive these simple matters home, and I never fail to do it with the five or six hundred young men who sit under me every year. But every citizen does not listen to lectures on sanitation, although frequent opportunities are given by the various lecture bureaus. Popular bulletins, such as those splendid sheets which come so regularly from Dr. Evans's

* Parsons, *loc. cit.*

office in Chicago, can do much good. The press, when appealed to, will render great assistance.

The public is inclined to believe that when an ample potable water supply has been provided, all that is necessary has been done. Sanitarians know that the contrary is the case. They may point out to the citizens that *sewage disposal* is quite as important. They may cite the story of Dantzic, which had good water in 1869, but the typhoid rate did not decrease materially until 1872 when sewers were added. Vienna had good sewerage and bad water up to 1874; the death rate was 340 in 100,000. That year good water was supplied and the rate dropped to 11 in 100,000. With good water and no sewerage the soil becomes saturated with refuse matter, a hot-bed awaiting the planting of pathogenic bacterial seed. Sedgwick, referring to cholera, figuratively states that "Pettenkoffer has given the key to the whole situation by saying that filth is like gunpowder, for which cholera is the spark. A community had better remove the gunpowder than try to beat off the spark; for in spite of their efforts, however frantic, this may at any time reach the powder, and if it does, is sure to blow them to pieces." The next great problem that New York City must solve will be that of sewage disposal. It will involve an expense vastly greater than the colossal sum now being spent for the magnificent new water supply.

Half the cost of living goes to pay for *food.* The centralization of population requires its transportation to the centers, but it does not enforce its exposure, uncovered in the streets or shops, where it collects the dirt and attracts flies. For a century it has been known that certain kinds of food could be preserved for later consumption without injury to health. There is no objection now to the preservation of food provided it is done in the proper, that is, harmless manner. The adulteration and sophistication of food are outgrowths of the development of the city and the improved means for world-wide transportation, coupled with the degeneracy of those who live by bartering and their desire for luxuries. The chemist has been the Cartouche and Sherlock Holmes in the abominable business. Yet ignorance and disregard for the consequences so long as gain resulted have been behind the supply of one particular food, milk, which is the main support of the

weak and helpless. The government has formulated satisfactory laws against the adulteration of the coin of the realm and enforces them vigorously. We have food laws now, but they are not satisfactory, nor are they always properly enforced. In fact, they cannot be fully enforced as long as they admit of constant quibbling as to the meaning of common words in our language. No doubt these objections will be removed, for it is a time of fuller awakening to the conscience of our civic value.

Clothing which has been exposed to such infectious diseases as diphtheria and smallpox, is now destroyed or duly disinfected, at least theoretically. This is not the case with clothing, either second-hand or new clothing, made in the sweatshops, where we know tuberculosis is rampant. Clothing thus serves as a means for the spread of infectious diseases. This can be stopped by requiring new clothing to be thoroughly disinfected before allowing it on the market, or, better, by applying the old Mosaic law enjoining the strictest cleanliness. Moses really anticipated our modern sanitary laws, for cleanliness is the beginning and the end. The existence of sweatshops in cities is one of the dark blots on our vaunted civilization.

The problems of city sanitation no doubt can all be solved with unlimited means and unrestricted legal power and the machinery for exercising it. Practically, however, the economics involved affect the situation. Successful manufacturing enterprises usually begin with *experimental plants* and, furthermore, keep them constantly in operation afterwards as an economic means of improving their efficiency. Some cities have appreciated this principle as shown in the Lawrence Experiment Station at Boston. But these things cost money and all know what influence "taxes" is made to play in all political campaigns. It appears not unfrequently that the excuse is offered on the part of budget committees, or similar regulating bodies, for not apportioning appropriations, "we cannot afford research." No political party, if it went out of existence, could leave a more lasting monument than the establishment of the principle that a great city cannot afford not to establish such experimental stations. If the leaks are stopped there will be plenty left not only to establish bureaus of investigation, but some to save as well.

A progressive manufacturer does not hesitate long in substituting more efficient machinery. He also knows that his people are more efficient and happier in good sanitary surroundings. So, even if the leaks are stopped and the cost of running mounts up, the community is the better able to bear the burden and does it more cheerfully. The average American doesn't mind paying a suitable price for a satisfactory article — in fact, of late he has become somewhat accustomed to paying a little more than he should.

The complications arising from the growth of cities call not only for "the employment of well-trained, tactful, honest, energetic, and fearless health officials," but also lay a responsibility upon all forms of educational activity to bring about a "better appreciation by the people at large, of what is conducive and what a menace to public health," and individual safety.

Now I recognize that what I am going to say in closing is liable to be interpreted to the end that fools rush in where angels fear to tread, but I have my opinion about it and it is only a statement of opinion that provokes discussion. Minds are made to be changed and I am ready to change mine, but I am very thoroughly convinced of what I am going to say and I trust it will be taken in the right manner. It is in regard to health officials. I do not think because a man has the M.D. he is a health official. His training in sanitation has been limited, is incidental, purely incidental. I do not think a man should have charge of the health of a community who is an M.D., but he should be a trained sanitarian, and have the M.D. incidentally.

I cannot refrain from expressing an opinion bearing upon the organization of a health department. The numerous details, especially financial, should not be thrown upon the head any more than the captain of a warship should look after the details of the ship's larder. The chief needs every particle of his well-trained brain and energy to deal with the great problems of the city's health. He should be provided with a financial coadjutor, as it were, a man of absolute rectitude, and as well trained as himself, but along another line — a man who will see that the purchasing power of the city's money is equal to that of a private corporation. The terms of office of these directors, technical and [illegible]

should be limited to the period of normal human efficiency, decent pension provisions being made for them when that period shall have ended. They would thus be unhampered by any political, religious, or social associations, in the conduct of the Department. I recognize that such a proposition is somewhat radical, and sounds a bit Utopian, but I am glad to say that my confidence in my fellowman is such that I am willing to give such large powers to him. Our democratic government breeds men worthy of such confidence; if it do not, then it is a failure, and we are not willing to acknowledge or to accept that verdict.

DR. FRONCZAK — Professor Baskerville certainly deserves our most sincere congratulations on his paper. It is interesting in every detail, and I have no doubt that a most interesting discussion will follow this paper. The discussion will be opened by Dr. W. L. Coons, of Yonkers.

DR. COONS — I feel more than embarrassed to open discussion after such an able paper, but I would just like to emphasize a few of the thoughts of Professor Baskerville. In speaking of the energetic health officer — when I was appointed by the health commissioner of the city of Yonkers I took my position with the idea I was going to accomplish great things, carry out some great ideas I had, but so long as the position of health officer of the different cities and communities is not divorced from politics we are more or less hampered, as you all know. The appropriations and the backing that you get from the commissioner of public safety is influenced entirely by the influence it has on the taxpayers and by the amount of money expended. The beautifying of the city of Yonkers has been going on rapidly for the last few years. Even the poorer people are moving into the better and more sanitary localities, which is an incentive to the property-owners to rebuild and reconstruct their insanitary tenements. This improvement is going on. We have, of course, a condition in the outlying districts of cesspools overflowing constantly and the exorbitant charges of the scavenger to the small property-owners makes it difficult and hard for the health officer to enforce these matters strictly. But we have made some progress in that direction and have accomplished much good.

Referring to the smoke nuisance. We have succeeded in getting some of the large manufacturers in Yonkers to adopt the smoke-consumer apparatus. This relieved to some extent that nuisance in our city. The New York Central railroad has co-operated to some extent and we are frequently receiving promises from them to burn hard coal while passing through the city and they do do so for some time, but when we release our efforts they continue to burn soft coal.

The spreading of contagion through the means of clothing was taken up by our department last winter and we required the people connected with churches and charitable organizations to discontinue their rummage sales. and I believe in different localities we saw a decrease in the number of cases of contagious disease. This year I have been tempted to allow them to proceed with the precaution of finding out pretty definitely where the clothing came from; whether from any infected homes or homes which had been infected recently. We shall never, in Yonkers or in any of the large cities, accomplish things we would like to accomplish until the position of health officer is divorced from the political situation. While we are able to get on and do a great deal, the question comes up of the influence. Eight years ago I was appointed on the board of health under the former charter of the city of Yonkers and I took some action against certain persons and the defeat of our mayor at that time was attributed to me. It ran along for sev-

eral years, and our present mayor had the authority to appoint me under the second-class charter. I have, of course, his support as far as possible.

We have a stream passing through the city of Yonkers which is a continuation of the water supply of Yonkers. After passing through the supply of Yonkers it flows into a stream where it is contaminated and where refuse is constantly being thrown in, and we are trying to have that made into a public sewer. We have the opposition of the property-owners. We also have the question of expense, but we hope to be able to accomplish that ultimately.

Dr. George E. Ellis, Dunkirk — I may say that I have enjoyed this very able paper very much, and I do not feel capable of discussing it. There are many things which apply not only to New York city, but to the smaller cities — particularly the garbage question and the city water. In our little city of Dunkirk we are not troubled with subways nor the lack of air. We have plenty of lake breezes up through our streets most any time, especially in winter, but I often think you can compare cities to a house. You undoubtedly, all of you who practice medicine, have entered a house where everything was spick and span in the front of the house — the parlors were dusted and everything arranged nicely, the dinner table was set — but if you went into the kitchen to get a glass of water you found out how they lived. I think it is the same way with cities. With our own city we have a small place, about 20,000. We have possibly as many or more miles of pavement as any cities of the State, and they are well kept. We have our city well sewered — we have one portion of the southern end of the city not sewered because they have no place to sewer it, but the main part of our city is well kept and perfectly sanitary. But with all our sewer system and houses suitably connected with it, they empty into the lake and from that lake we get our drinking water. A few miles above us is a village of Fredonia, which is immediately or almost exactly over our intake where we get our water supply. To add to this we contribute our sewer system, which goes into the Crooked brook, and this indirectly through a cesspool which goes directly into this creek, gets in above our supply and comes down and contributes to the Fredonia sewage which we drink. The other sewage goes down into the bay, making the whole bay a cesspool. A nice northwester sends it around the end of the breakwater and sends that also into our intake. So when the winds are favorable we have both food and drink.

Now this is a question that applies to other places — Buffalo, I think, as well as Niagara Falls. I often wonder how Niagara Falls strain their sewage; whether they have a wire fence to catch the coarsest or how they arrange it, but they certainly do contribute a great quantity of it. But we hope at some time to remedy this.

Dunkirk is every man's town. You can count the people who are worth $100,000 on your finger tips almost; most of the citizens are laboring men who own their homes, and you hesitate to tax the people sufficiently to remove this nuisance. As an estimate of what we want to do, I think it will cost something like half a million. It is quite a sum to raise in a city of our size, but we are working and intend to remove all this sewage from our lake. I understand the authorities at Albany say they will make Fredonia take theirs out when we take ours out, so we live in hopes.

The garbage question is a serious one in our place. We have no regular system. We had a man who collected this in wagons and fed it to hogs in the country, and this became so bad that we made him give up the contract and at the present time a man is hired by the day to draw this garbage into the country. But this is not sanitary at all, and we are working on some plans and hope to have them completed as soon as we can dispose of our garbage.

Now in regard to the special sanitary officer I agree with the speaker that he should not be dependent on the public for the practice of his profession for his living, for we all know that if a man lives up to what he believes to be right as health officer he won't have much practice. I found that out to my sorrow. I have been health officer of the city for about ten years. There was a time when they used to come out with guns and order me off their places. They don't any more. We find it very hard to get everybody

to put their garbage into a pail. They are more apt to put it in the back yard. While all these things are to be worked out, at the present time we have not been able to do so.

DR. E. H. CODDING, New Rochelle — In regard to the health officer's position and as to his tenure of office, it was my good fortune to serve my city for a number of years as health officer. About a year ago the political situation changed and they attempted to make me go, and the man who was to take my place come up against the civil service and as he could not pass the examination he did not get the appointment. We have a new charter in New Rochelle, and in that charter we have a provision that the health officer is removable only for cause and that is a step in the right direction. I believe everyone here could, if he used his energy, have his charter changed in that respect.

DR. P. R. BOWDISH, Cornwall-on-Hudson — I hope it won't be out of order for me to speak of the transmission of typhoid fever and other like diseases from country places or summer resorts to the cities.

I think that is one point where cities are largely defective. Cornwall is on the Hudson river in the vicinity of West Point. There are in our neighborhood about seven fresh air farms run by the missions in New York city. There are times when typhoid is found among these children and is taken back to New York, but strange as it may be, we have no typhoid in Cornwall. There is seldom a comparison between the typhoid cases that come out of our summer resorts and those in the summer resort itself; and yet people all acknowledge that there is no immunity against typhoid. In other words, if typhoid existed in rural communities, if the people took it home from our summer resorts, it would exist amongst us. But it does seem to me that there is a point of laxity, and that is the lack of supervision of the cutting, storing and handling of ice in the water on the railroads, boats and sometimes within the limits of the city. I don't know what method is used now, but I do know that a few years ago a large part of the ice that was stored was stored in horse manure. I do know that along the Hudson river men coming from the county almshouse, almost invariably suffering with latent tuberculosis, are employed to cut this ice; I do know — because I am traveling on the railroad constantly, going into Weehawken at least three times a week — I do know that really sick men are handling this ice in their bare hands, placing it in the tanks and then washing off their hands at the spouts that are draining into the pails in which they carry the water. I think this is a point which should be carefully looked after by the municipal authorities.

DR. FRONCZAK — Professor Baskerville will close the discussion.

PROFESSOR BASKERVILLE — I don't know that anything is required to be said except to regret that there was not more discussion. However, I am very appreciative of the courtesy extended and the opportunity given to associate with those who are looking after the welfare of what I regard as the chief asset of the nation, namely, the health of the nation.

DR. FRONCZAK — Will Dr. Codding take the chair.

DR. CODDING — This honor is so unexpectedly thrust upon me. I want to say what was not announced before — this evening at 7 o'clock there will be a meeting of the New York State Sanitary Officers' Association in the auditorium here. I presume all here had the postal card notice to call their attention to it, and I simply announce it now to remind you again.

The next paper is by Dr. Fronczak, our health commissioner here, of Buffalo. He needs no introduction from me.

MILK AND FOODS

By FRANCIS E. FRONCZAK, M.D.
Commissioner of Health, Buffalo.

Milk, with the exception of wheat, is the most universally used of all foods. From the fact that it is the main stay of infancy and childhood, the dependence of the sick, the adjunct and nutrition of the well, and that it is a fluid of very peculiar characteristics, it has ever attracted the attention of investigators and sanitarians; and, at the present time, there is probably no other article of food which is receiving more study, or concerning which we are in a better position to know regarding its possibilities for good or for evil.

Up to the past summer, the milk supply of Buffalo, outside of the city, had received very little attention from the health department. In reorganizing the department the milk industry was placed under closest surveillance. It was then discovered that the source of supply of the milk coming into the city was, as a general thing, very much more highly contaminated than was justifiable, and that the public health was materially jeopardized. This indicated the necessity for the inspection of the source of supply at the dairy farms; so at my direction, the bureau of food and drugs organized a dairy farm inspection service which was equipped with five inspectors.

At that time, the bacterial count of the milk, which is a sanitary index, was excessively high, the average count being more than a million. The work was organized by assigning an inspector to each railroad bringing milk into the city, by classifying the names of the shippers at each particular station, and by having the inspector go from one station to another and at each place inspect all the dairy farms which shipped from that place.

After a reasonable period of this work, the conditions upon which the contamination of the milk depended were plainly found. The features disclosed were so interesting and so generally spread throughout the section of the [illegible] very fair picture of the [illegible] throughout the State wh[illegible]

As regards the cows, while they appeared healthy, none, with a few exceptions, had ever been tested for tuberculosis by the tuberculin test. Inasmuch as at least 30 per cent. of the cows in all the herds are more or less affected with tuberculosis, even though they appear healthy, this single fact has much significance.

In a few instances, cows were discovered with inflamed teats, which, of course, contaminated the milk with streptococci. Secondly, the barns were found, with a few exceptions, from being dirty with dust and cobwebs, to being litterly splattered from top to bottom with dried manure; from being defective in construction by having cracked walls and open seams, to having rotten floors with pools of filth upon them from defective drainage. When it is considered that the cows are in these barns from five to six months of the year, it is not difficult to see one leading source of contamination by filth. Thirdly, the barnyards were found filthy in a large proportion of the cases. It is not to be expected that barnyards are to be clean places, but it was expected that they would not be veritable pools of filth with accumulations of manure. Like the conditions in the barns, this explains a part of the contamination. Cows cannot be surrounded by environments of this kind without being soiled. Fourthly, it was found that a large proportion of the dairy farms had no milk house. The object of a milk house on a well-kept dairy farm, is to handle milk away from the possibilities of the stable. In the absence of a milk house, it was found that the milk was being cooled and manipulated in the open air in the summer, and only protected by a shed-like structure, or was cooled in the barn or in a shed with its equivalent possibilities. Again, it was found that a number of milk houses adjoined barns and communicated with them by doors so that the milk apartment and the cow stable were practically one room. Another source of contamination which was found was that a certain proportion of the milkers milked with wet hands — one of the most disgusting of all forms of milking. It was recorded also that few, if any, of the milkers took special pains about having their clothing clean during milking time, which was another cause of contamination. Another feature which was observed was the keeping of horses and cows in the same barn. Much surprise was expressed by the farmers, and objection made to our

requiring horses and cows to be stabled separately, until it was explained to them that there was twice the number of animals and twice the amount of manure in relation to the amount of milk produced; that milk produced by twelve cows had the manure of twelve animals only to be contaminated by, whereas additional horses doubled the amount.

One feature which, throughout the inspections, was found to be well done, was the cleaning of utensils. All dairymen seemed to be impressed very thoroughly with the necessity of having their utensils well cleaned. Undoubtedly, this was partly the result of the fact that the cans were being returned to the farmers in a very unclean condition, so that they had to clean them in self-defense.

After recounting all these conditions which were found, and before referring to the manner in which they should be corrected, it is proper to state the significance or the bearing which they have upon milk, as I assume that a part of my audience is non-professional. These unsanitary conditions may be summed up in the one word, dirt; and when dirt enters milk, it carries with it bacteria. It would be a simple matter in the interests of good milk, if by removing the dirt, the milk would again become pure. Unfortunately, this is not the case. Every particle of dirt which enters milk carries bacteria, and, even if the dirt is removed, the bacteria remain and will multiply and contaminate the milk.

This brings us to the question of bacteria.

Milk, when it is first drawn from the cow, theoretically has no bacteria, but, as a matter of fact, even the milk which is drawn immediately from the teats is somewhat contaminated from the little germs which are in the milk ducts, so that germless milk is almost unknown. Nature never intended milk to see the light of day, but intended that it should pass directly from the teat to the alimentary canal. As soon as milk became a commodity, it became contaminated, and in the present state of the milk industry, the product is exposed to contamination from the time it is produced until it reaches the consumer. It is, therefore, the duty of the sanitarian to minimize or eliminate these sources of contamination wherever it can be done.

The conditions which were found from inspecting

Western New York explain the contamination at the dairy. Their correction, therefore, is in having and maintaining the barns and accessories in a perfectly clean manner.

The first step, possibly, in securing a better condition at the dairy in the interest of municipal milk is to place all dairies under the permit system, requiring a permit from every dairyman who wishes to sell milk in the city, and not to issue a permit unless the equipment and methods are entirely satisfactory. The second step is to give publicity to conditions and so excite a spirit of rivalry in attaining excellence, and by practically showing the dairyman that sanitary excellence means financial profit. If the milk from insanitary dairies is excluded from the city when it becomes accidentally contaminated, the city milk man suffers loss of his milk and thereby of his trade. He therefore prefers to get his milk from a farm which is properly managed and is not liable to have its milk shut off. So the product of the well-managed farm being desirable, there is competition to obtain it, and with competition, there are better prices. This is very cogent at the present time, inasmuch as it is not believed that the average farmer is getting a sufficiently high price for his product to pay him in maintaining the degree of sanitation which authorities desire.

The individual features of the dairy to which experience shows special efforts should be directed are, first, that the cows be examined by the tuberculin test. If it is a fact, and we believe it is, that this is a prominent source of tubercular infection, particularly in childhood, and if tuberculosis in the bovine species is transmitted to man, the elimination of the tubercular animal is a necessity. The difficulty, however, is in securing it. Herds should be examined yearly, but it is an expense and a rather exacting one on the dairyman, who can see no direct return from it. In the present crusade against tuberculosis, the State should make provision for eliminating tuberculosis among cattle, particularly among dairy cows, and in keeping it eliminated. This can be done through periodical examination and testing. The State should assume this expense.

Next to securing safe cows, cleanliness of the barns where they are kept is essential. Inasmuch as a large majority of the dairy-

farmers cannot build new and up-to-date barns, it is of practical importance to know in what manner the present structures can be satisfactorily made sanitary with the least possible expense.

We have found that defective ceilings, through which dust filters down, which is strongly objected to, can be made tight by the use of builders' paper, affixing it over and between the rafters with strips of wood. We have found that the walls of barns for a space of six feet, the area of principal contamination, can best be made cleanly by lining them with galvanized sheet iron. We have found that defective floors, once repaired, can be kept clean and in better condition by careful regular cleaning — neglect means decay. So, with sealed ceilings, bright galvanized iron wainscoting, sanitary whitewashing, and clean floors, we have the interior of the barn in such shape that it is not only satisfactorily clean, but is attractive to the eye as well. Many of the farmers whose barns have been so protected have been enthusiastic over the appearance, as well as the condition.

The disposition of manure is an important factor. It is usually the custom among farmers to throw the manure out near the barn and to leave it there, hauling it away at a subsequent time to distribute over the fields. It is rather laborious for them every day to haul the manure to a distance of fifty feet or more, as it should be done. To minimize this labor, many farmers have taken advantage of a suggestion to erect a little carrier on which the manure can be run off quite a distance and dumped with very little effort. This has been done in a sufficient number of cases to show that the method is of practical efficiency and to warrant its being adopted more generally.

It was gratifying, in the summer's work, to notice that in but very few instances, the farm water could be said to be a menace to the integrity of the milk. The farmer generally seems to have a keen sense of appreciation of the status of his water. If he were as well informed and as particular about his milk and its being clean, as he is about the water, it would lessen the work of the sanitarian materially.

Another surprise noted was the absence of recent contagious disease on any of the farms, and also the absence of tuberculosis among the farmers [illegible] of tuberculosis

in a farmer has been reported. This is not strong corroboration of the communicability of bovine tuberculosis to man. In the main, we believe these factors are correct on the almost 2,000 farms which have been inspected, inasmuch as the inspectors who did the work were medical men and were especially directed and had data to obtain in regard to them.

Cleanliness, temperature and age being the three factors which bear upon bacterial growth, the question of temperature received consideration. It was found that the instances where the dairymen used ice in cooling milk were exceptional, and that they almost uniformly cooled their milk by immersing the cans in spring water and allowing them to stand that way over night. In this manner, with real cold well water, and in the absence of the sun, the milk was found to be cooled down to sixty degrees and sometimes a little lower. From the time the milk was taken from this cooler, no further attempt was made to preserve the temperature until the product reached the city. A few dairymen used covering in wagon transportation, but generally the protection on the wagon, at the stations, and on the cars, was devoid of any consideration of temperature. The cooling of the milk by the farmer and refrigerated transportation by the railroads has become a close matter. It was found that milk was arriving. during the summer season in Buffalo, at a temperature ranging from seventy to eighty-five degrees, which was far above that which was acceptable; and that the milk was brought in, in cars having a temperature as high as ninety degrees, which was inconsistent with milk integrity. Negotiations were opened with the transportation companies with the view of obtaining refrigeration on the cars during the summer season. One of the arguments used by the railroad companies was that they did not wish to cool the warm milk from the dairy farms. This was a valid objection and appealed. In furthering the interests of better transportation, it was determined to secure better cooling at the dairy farm, and to that end the dairyman was notified that next season, wherever practical, he must secure ice to chill the milk properly before putting it on the cars. The department can, and wishes to, state to the railroad companies that, inasmuch as they do not wish to cool the warm milk of the dairymen, the dairymen do not wish to heat their cold milk in the hot railroad cars.

One of the dairyman's contentions in the matter is, not that ice is difficult to obtain, but, interestingly, that ice-cooled milk does not keep cool as long as that which is cooled by spring water, and that it sours sooner when the temperature rises. We have no means of knowing the truth of this statement, but it is a fact that it is the general opinion among dairymen who have ice as well as spring water to cool with.

To bring the milk of Buffalo to the standard of quality it should have, improvements must be made throughout the industry. Some of the more important features and those connected with its protection have been referred to. An equally important factor is that of transportation, and the experience of the department so far in this connection has been as follows:

Communication was sought with the railroad officials, but from the fact that the men in charge were not local, delay was encountered from the beginning. In reply to letters sent in reference to the matter, all of the officials preferred to have a conference, which meant more delay. At the conference finally held, the department presented the following facts:

That milk transportation was unsatisfactory, out of date and did not meet the requirements; that milk arrived in Buffalo at a temperature so high as to be detrimental to the product and to the public welfare; that this rise in temperature occurred between the dairy and the Buffalo platform. Records of temperature taken, experiments and investigations made, together with a knowledge of existing methods and circumstances, were also presented. Methods adopted in other cities were referred to, and plans for refrigerating cars at a low cost were suggested and explained.

The railroad officials showed an attitude not entirely responsive, though verbally willing, and wished to look into the matter. After some time the railroad companies presented their side of the case, which was as follows:

They claimed that the fault was with the farmer in not icing his milk at the dairy; and they suggested correcting the high temperature there. They also claimed that refrigerator cars were not adapted to frequent stops as is necessary in the milk territory; that to have more than one kind of car in the milk service

was not feasible; and that the low freight rates recently fixed by the Public Service Commission were a burden.

The department answered that time, not distance, was the important factor, the average train time being three hours, with often an hour or more added because of delays; that many shipments were received from branch roads where the milk had already been in transit; that it was not complete refrigeration which was wanted, but only such as would maintain the temperature of the milk; that the department had no direct interest in freight rates, and, while it believed that the railroads should be properly compensated, it held that a commodity which was so intimately associated with children, infant mortality, sickness and health, was entitled to consideration other than that of profit and loss.

The department also presented a device for installation in cars to procure refrigeration. This device was readily adapted and comparatively inexpensive.

After further delay, one road submitted a report of experiments made, showing a record of temperatures of cans placed on the cars at various stations. These temperatures ranged from 55 to 68 degrees, showing that the average rise was 1.47 a can, which, it was claimed, did not justify any change in the method of transportation. Another road made the same statement and quoted the same rise in temperature, 1.47, as if it had been made from their own personal investigation,—(it was undoubtedly borrowed from the other road on a mutual understanding).

But the railroads' attention was called to the fact that, while all cans put out at the high temperature of 58 and 70, only rose 1.47 to the same temperature as the car, because it could not rise any higher, the temperature of the car and the cans then being equalized. Attention was also directed to the important fact that all cans which were placed on at 55 and under, which is the proper temperature of milk, arrived at from 8 to 10 degrees higher, or at the same temperature as the warmer cans; showing that if all cans were put on at a low temperature, they would have the same rise of 10 degrees and more. In this respect, the railroad companies' exhibits corroborated the contention of the department.

The department insisted all the time that the subject was a simple proposition, and that its intention was to correct the prevailing unsatisfactory conditions. Although the matter has not yet been definitely settled, the railroads, no doubt, next season will accede to our contention.

It is not to be expected that all the trouble and all the work in obtaining milk integrity have been those which I have alluded to. The subject of the city milkman is not without indications for betterment. I will state, however, if in any city of this country, the milkmen are so uniformly alive and well informed on the matters pertaining to milk, as they are in Buffalo, it would be well; and if there are any facts or instances to the contrary, it can be said that they are largely the result of commercial cupidity, and not to ignorance. But very little has occurred, and it is with satisfaction that the department can testify to the almost uniform willingness of the Buffalo milkmen to do everything in their power to maintain, improve, and protect the integrity of our milk.

Many features in connection with their end of the industry have been improved. One fault has been that the city man did not remove his milk promptly from the depot after the arrival of the milk train. Simple as this may seem, it is a more important matter than it would appear to be. Leaving the cans at the depot means exposure to sun, heat, dust, tampering, and what not. The milkman comes down to the depot for his milk after a half night's work in delivering, and is rather fatigued. He would rather defer the moving of the milk until later, hence the delay. The department has realized throughout all the procedures of milk correction that action and example were necessary, and that notifications and the like, while having their value, were not as effective as a demonstration. The department adopted the policy of destroying the milk where neglect occurred after notification had been given. This was for example to others, as well as to the party at fault. When milkmen failed to remove the milk promptly from the depot after one or two notifications, and the product was found standing in the sun for some hours, the milk was thrown out. That milkman never left his milk again, and the example was salubrious to others.

The subject of milk destruction brings up the question of milk interdiction, because of bacterial contamination. Boston was the first city to adopt a standard of bacterial contamination beyond which milk would not be accepted in the city. The limit was placed at 100,000. Since that time twenty-five or thirty cities have likewise adopted a standard. While a legal standard of bacteria number cannot be adopted with milk as with its chemical composition, a certain count can be adopted as an index to sanitation. Buffalo, this year, adopted 500,000 as a limit beyond which milk would not be accepted, and that which contained colon bacilli was likewise excluded. When contamination showed that milk contained this number of bacteria or colon, the dairyman was notified that his sanitation was defective and to make correction. A second examination of the milk was made within ten days. If it showed no improvement, the milk was interdicted. Experience showed that when this action was taken, improvement usually followed. Where certain dairymen did not respect the interdiction and continued to ship milk, it was dumped. Knowledge of this new procedure on the part of the authorities became disseminated, and the interdictions were respected, and, additionally, cleaning up and sanitary improvements were inspired. Action would appear to be the keynote of successful sanitation.

As illustrative of the effect of cleaning the dairies and interdicting the milk which was contaminated, it can be said that the average bacterial count of the milk after three months of this kind of demonstration has dropped from the millions to the present average of 300,000 and less, and with twenty per cent. of the dairies supplying the city, the count is equal to that of some of our good Pasteurized milk.

The limits of this paper do not permit of but a casual allusion to the subject Pasteurized milk. It is proper, however, to refer to the fact that our department investigated the Pasteurizing of milk in this city. It found that concerns which were Pasteurizing milk were receiving their raw milk in a highly contaminated condition, and, subsequently, although Pasteurized, the milk was going forth in a more or less non-Pasteurized state; and one instance was found where contamination was greater after going through the Pasteurizer than before. It is to be considered in explanation

of this that such an instance was an incident and not customary, and it was explained by unusual conditions which were in evidence at the time the milk was subjected to examination. It does illustrate the fact, however, that commercial Pasteurization does not afford the security which it is generally supposed to give. The general impression is that Pasteurized milk is not only pure and better milk, but absolutely safe milk. This belief, in part, comes from the name given to the process, which is not explanatory, and being that of a distinguished investigator, conveys the impression of security. As a matter of fact, the name should be changed to "heated" milk. A criticism which can be made regarding Pasteurized milk is that it is prepared by the various milk concerns, not in the interest of the public health, but in the interest of commercial economy. Pasteurized milk keeps longer; old milk can be Pasteurized and preserved until sold, and the name additionally adds to its salability.

The Department, in the near future, proposes to have all Pasteurized milk labeled with its age, the date, and the temperature and duration of the heating, and so offset any liable misconception. The Department also proposes, in connection with the labeling of Pasteurized milk, possibly to label all milk during the summer season with a label giving pertinent information regarding the best method of keeping milk for the householder to use, and a few brief remarks concerning its relation to infantile diseases.

In other words, it is proposed, during the heated term, to make the milk bottle not only a carrier but an educator, and daily to carry into the household certain truths pertaining to it — truths which, if followed, will not only maintain better milk but will tend to prevent sickness. These labels, of course, will be printed in the various languages in certain sections of the city.

Another feature, which is not generally known as it should be, concerning Pasteurized milk is that it requires more care than milk which is not Pasteurized. This fact is the converse of what is generally practiced. It should be understood that pathogenical germs grow better in heated milk than in raw milk; that the germicidal properties of milk are impaired by heating, and the organisms do not have to struggle for existence in it as they do in the raw product. The question of Pasteurization, so far as Buffalo

is concerned, is not a cogent one, and commercial Pasteurization is not really necessary in the interest of public health.

The bureau of food and drugs in the health department of Buffalo, in its administration of the inspection service, both with regard to milk and the other food industries, has adopted the score-card system. All inspections from groceries to milk houses are under the score-card method.

It has been found to be extremely satisfactory and, in so far as the milk industry is concerned, it has excited a spirit of rivalry and comparison in securing excellence among the dairy farmers.

It has removed an undesirable factor in all inspection work in eliminating the personal factor as much as possible, and makes the work approach exactness. In the coming year, in the dairy farm inspection service, the Department proposes to leave a copy of the score-card with the dairyman.

The price of milk is a matter often under discussion at the present time. Milk in Buffalo is sold on the average of seven cents a quart bottle. The farmer receives from eleven (11) to fourteen (14) or fifteen (15) cents a gallon, depending upon the season of the year. With sanitary requirements essential to milk integrity, it is not practical for the farmer to produce milk and make a small margin of profit at these low rates when consideration is taken of the price of labor and the price of feed.

Milk is the only article of food which has not risen in price, and, while we do not advocate a high price for milk, we believe the price should be a little higher and the same as that in other cities of this size. Washington pays eight cents; New York seven to ten cents, etc. It is peculiar that raising the price of milk one cent a bottle, which means thirty cents a month to the average family, should create so much opposition. If it were only known that cheap milk means unsafe milk, or dirty milk, it is doubtful if the extra cent would be looked upon so strongly.

No feature connected with the business is of any greater importance than the cleanliness of the utensils, and of all utensils — the milk can, because it is in the milk can that the product remains the longest. Dairies may be clean and individual effort may be praiseworthy, but if milk is placed in dirty cans, everything is offset.

The department's attitude toward dirty cans is merciless and its inspection as rigid and extensive as its abilities permit. Every milk can cannot be inspected every day, but it is the aim of the department to inspect all the cans every ten days. The system of notifying the owners of dirty cans to give more attention to their procedures, while moderately effective, does not bring the return which should be expected. But when a dirty can is destroyed it makes an impression. When milkmen are negligent in cleaning their cans they are notified to keep them cleaner. If after one, and rarely two, notifications, they continue to be derelict, their dirty cans are destroyed. One demonstration of this character has been found to be sufficient.

Milk cans, after carrying milk for some time and being left to stand for some time with a little milk in them, soon become offensive, and, even when cleaned, an offensive odor can be detected. The only way to make cans reasonably safe is to sterilize them, and but few of the milkmen possess steam for this purpose. It has suggested itself that the municipality might, under certain conditions, establish a steam disinfecting plant near the depots which fortunately are close together in Buffalo. Empty cans could be left, on the way to the depot, to be sterilized before being returned to the country.

The details of such a scheme have been looked into, and it is believed to be perfectly feasible. The features of the operation would be that the cans could be left at the plant, sterilized and subsequently sent to the country. This could be accomplished with only the delay of missing one train and at a cost of a cent and a little over for each can sterilized. If the city were to establish a steam plant of this character, which could be done very reasonably — certainly under $4,000 — and the milkmen paid for the sterilization at the rate of one cent a can, the plant would pay for itself and would, it is believed, materially reduce the bacterial count.

Investigations made in regard to the influence of cans on bacterial contamination show that it is great.

Numerous illustrations are on record where the bacterial count in each of eight or ten cans from the same dairy, at the same time, all produced under the same conditions, vary so widely as to leave

no other explanation for the difference than that it is due to the condition of the container.

From the amount of prominence given the care and attention to milk it might be inferred that it was the only article of food which is carefully watched or which has dangerous possibilities. Meat, however, is scrutinized with fully as much care and possesses dangers equally serious although not so imminent.

No meat is eaten in Buffalo without its having been examined several times from the time when the animal is brought here until it reaches the consumer.

Examinations are made on the hoof and all tubercular, bad, lump jaw and staggered cattle are shot and removed to the rendering works. All others are subjected to a post-mortem examination, and none are permitted to reach the market for human food unless they come up to the standard. The carcasses are also examined in the coolers and in the public and private meat markets and in the food factories. The general features of meat examination are doubtless well known to you.

There is one phase of the industry, however, in Buffalo which is more than an ordinary menace. Buffalo is at the edge of a large dairying section, and periodically the weeding out of unfit cattle causes large numbers of them to be thrown on the market here for cheap food purposes. These cattle, known as trimmers and canners, are, very largely, tubercular. They produce a low grade of meat and are generally used for sausage. It has taxed the energies of the department to minimize this factor, but it appears to be an ever-present one, and will be until the State makes some provision for eradicating unfit animals and making some compensation for them to the owners. The percentage of tubercular cattle in these shipments sometimes averages as high as 75 per cent. in a car.

The only impression which has been made upon the traffic has been through rigid inspection in causing extensive condemnations, thereby making it a rather unprofitable venture. In the past ten years there does not seem to have been any diminution in the relative number of tubercular animals condemned on the hoof.

I regret that I have not the figures with me, but it can be shown that there is no appreciable diminution in the number. This does

not speak well for the State's efforts in eliminating tuberculosis either here or in those States where the cattle are shipped from. There is no way of determining, by any direct method, the security afforded against tuberculosis from cattle, but it is believed that the system of inspection in Buffalo does give security. If, in the case of actinomycosis, its rarity in man, its prevalence in cattle, and its being a transmissible disease, are evidence of the efficiency of inspection, it can be stated that the inspection service in vogue here is satisfactory, and has some features in detail which could well be adopted and emulated elsewhere.

No system of food protection would be complete without giving attention to the various food industries, bakeries, confectionaries, restaurants, etc.

In our comprehensive system in Buffalo these are not omitted, but are inspected with regularity, systematically and under the score card system, so as to eliminate the personal factor. With this system it is believed that no city has cleaner industries in this line than the city of Buffalo. With the new ordinances which have been passed, bakers are required to wear clean, washable outside suits and caps and suitable dressing rooms and toilet facilities have been provided. All water-closets and prohibited openings have been removed from the bakeshops and violators have been punished.

The remaining feature which is now under consideration is the stamping of bread with its weight. There is considerable difficulty in bringing this about and some opposition, on the ground that the bread stamped at the time it is baked suffers considerable loss of weight afterward by evaporation. It has been found that a large proportion of the loaves placed on the market are underweight and that the majority of the contents of the containers of crackers, cakes, etc., alleged to weigh a pound do not weigh that much. From these and other facts it is believed that some regulation is a necessary requirement.

The matter of having bread wrapped in paper containers is also under consideration. The trade custom of handling bread is not as offensive as it has been in the past, but the manner in which loaves are thrown about on co[illegible]d bread baskets makes it a much [illegible]

The place where we eat is always a matter of interest. The former application of the dictum, "Where ignorance is bliss, it is folly to be wise," does not apply extensively to Buffalo restaurants any longer. They have been thoroughly cleaned; water-closets in them have been removed; provision has been made for the washing of the attendants; and extended facilities have been provided for the washing and keeping of utensils. A step farther is now being taken by inspecting all dishes and eliminating those which are chipped and cracked, especially those which are used for drinking purposes.

In the whole range of food inspections, there are many minor details which would be interesting to the sanitarian and which can best be appreciated by seeing the work as it is done by the numerous inspectors throughout the city; and any who are interested will honor the department by calling at the office where they will be gladly shown the system, methods, and results of the work in Buffalo in detail. The bureau of food and drugs, in carrying on its work, has an extensive system of blanks for the purpose of checking and notifying the businesses under its jurisdiction. These blanks are considered to be of considerable excellence, and so much so that sets of them are in almost constant demand by schools and health departments of other cities. This is not referred to in the spirit of pinning medals on ourselves, but merely to call attention to some of the features which are in operation here and which might be of interest to some of the gentlemen who are in attendance at this conference.

I regret that very many unexpected duties have fallen upon me at this time, and that this paper has of necessity been of a desultory character. It was my intention to have presented some of the statistical features of our work, but the responsibilities which I have referred to have precluded that.

DR. CODDING — I think we must congratulate Dr. Fronczak on his very complete and clean-cut handling of a most complex subject.

DR. TOTMAN.— I think that listening to Dr. Fronczak's paper has shown that the subject of milk and foods is no small matter in health work. I wish to congratulate Dr. Fronczak on the presentation of this paper which is so full of bristling facts, and when we get the opportunity to read this paper over carefully and digest it I think we shall have material for very many serious thoughts upon the subject of milk and foods, especially of milk.

Now in the city of Syracuse, nearly five years ago, when I was first appointed health officer — and I wish to say that I had served five years previously or I never could have assumed the duties of the health officer in

any way to be considered without those five years of previous experience — some years elapsed between the two services — the first problem that I attempted was the milk problem. I was fortunate in having as my superior officer the commissioner of public safety, a broad-minded, capable, willing man to work, so one of the first things that I brought to his attention was the need of doing something for our milk supply. An investigation and a pretty accurate knowledge showed me that the conditions were not much better than they were possibly when Noah established some method of supplying milk when he came off the ark. They were simply abominable. Dr. Fronczak has given us a picture of what he found around Buffalo. The same conditions were found around Syracuse. I never saw fouler conditions. It was impossible under those circumstances to produce any milk of any sanitary value.

I brought this matter to the commissioner's notice and he took it up with me. They were having great discussion in New York city about the milk problem. Many of you probably remember Dr. Darlington's work and the oppositions he met. The commissioner came to me and he said: "Doctor, we must not take any action in this matter of protecting our milk. It is too big a problem. We shall be whipped out of it." The matter was in the paper and the farmers threatened that they would get off the farms. The commissioner said: "We don't wish to disturb the farmers. We shall have a fight on our hands." I said to the commissioner, "We will take the first step." And he said: "What is the first step?" I said, after considering the matter very carefully, "Let us, first of all, get a dairy inspector." Well, gentlemen, he said: "Go ahead and see if you can find one." I went to Cornell and had a man recommended to me there and laid the matter before him. He was working in the laboratories there and teaching some. I laid the matter before him. Commissioner Pearson, our Commissioner of Agriculture, was at the head of the department and recommended the man.

He came to Syracuse and looked the matter over and declined to serve. He said: "The problem is too large for me; I don't want to tackle this job." I looked about me and found finally a Scotchman, fifty-four years of age; a successful dairyman, a dairyman supplying the city of Syracuse with milk for years, and he had been successful at it. I got him to do the work and he has been dairy inspector since. I think the whole country can't find a better dairy inspector that Mr. James Leeds. I measure him against any dairy inspector in the United States to-day. He is a man who is able to deal with the dairymen.

My first hope was to educate the dairymen, so Mr. Leeds went out. I went out with him. We got others to go. It wasn't but a little time before, by the aid of posters of the United States Agricultural Department, we had made score cards and we began the education of dairymen. We had a great help in one thing. We had the Tully farms which were supplying certified milk as an example. We used that farm as an example. We encouraged our farmers and dairymen to go out and see the Tully farms, and many did. We furnished conveyances sometimes to take the farmers out there. Little by little that knowledge spread among the dairymen. So the work has gone on.

We established in our Sanitary Code the 500,000 bacterial count. We find that that is too high. We are now about to introduce into our Sanitary Code that the bacterial count shall not exceed 250,000, or possibly less. I would favor 200,000 as the highest. If we can adopt 250,000 that will be a great gain. We find it possible to compel the farmers to furnish milk with a low bacterial count and it is successful.

In addition to that, we have compelled the farmers to erect milk houses separated from the barns. That has been an equally successful matter. We have compelled the farmers as far as possible to ice their milk. We are to demand a milk furnished to the city with a temperature of fifty degrees — the dairymen must ice their milk immediately. Now we find that it is feasible, and the milk should be iced. We have established this work out on the farms.

Our dairy supply five years ago represented something like 317 dairies, and now we have about 500 dairies supplying the city with milk. The farmers

did not go out of it. They have gone into it, and our dairymen have increased their herds and have taken up this work. They have made their dairies good; they have made their cows good, and with the increase in this work we find now that instead of having less than 5,000 cows supplying the city with milk we have more than 7,000, nearly 8,000 cows supplying our city with milk. The price of milk has gone up. Our milk runs from seven cents for good milk, and many of our farmers sell their own milk in the city, bringing it in ice and delivering it for seven cents. They are making a good profit on it and are very much pleased with it. Other milk is supplied at nine cents and ten cents, and our certified milk from the Tully farms is twelve cents a quart, and that milk is used by many of the citizens of our city.

A year or so ago when the commission appointed by the Canadian Parliament came into this country investigating the milk problem they came to Syracuse. They had been told they need not come to Syracuse, we didn't have anything. We didn't advertise the matter very much. Well, you have seen their report. I won't say anything more about that.

We have been successful in immensely increasing our milk supply in sanitary measurements, and no city need hold back in the attempt to increase the standard of their milk supply. It is well worth while.

Now I have all my life, from earliest years, practised medicine and made a study of milk, and I have a subject that I use on occasion wherever possible. One of the best places that I can talk is in the nurses' schools where I have an audience of something like forty or fifty nurses to talk to. I can talk an hour on the subject of milk and I can present to them ideas about the purity and about milk as an article of food they had never dreamed about, and I believe if I had the time to talk to you an hour I could tell you a few things about milk you have never dreamed about, never thought of having considered. I am going to state one and I am going to give it with a foundation which reaches as far back as Hunter; that great eminent surgeon who established and taught the fact that the blood is a living tissue.

One of the things I preach is that the milk is a living tissue, that it has vitality, and I was glad when Dr. Fronczak spoke of it in his paper, that the milk had a vitality. You don't destroy that vitality without destroying the integrity of the milk. I advise health officers as a body to study this subject, to get ideas into your head that you can talk to people in a sound, common-sense way about milk, the care of it, the production of it.

And to the consumers, that is not the least part of it. The care after it comes into the hands of the consumers is really only beginning in this matter. In the city of Syracuse it is an enormously big problem. The more I see of it the more difficulties there are in it.

Now this question of tuberculosis in the herds. It is an important one. I think that as health officers we should stand with a bold front to the State authorities, compelling them to take a share in that work, the elimination of tuberculosis from the herds. We accidently found in one herd that a dairyman had sold two cows to a man who kept a meat market, an Italian. The physician attended the Italian's family and he thought it might come from the meat which he saw in the market and which the children had handled. The physician traced the matter and found the Italian had bought two cows from a dairyman — an old cow for $10, and the dairyman to be sure of the bargain had put in a young cow with it for $20. The doctor and the dairyman came to me and we had the cows examined and they were f und tubercular and were sent to the reduction plant. The dairyman came to me asking my assistance to get back the thirty dollars for his two cows. We got on to the fact in this way.

The State department took the remainder of the herd of twenty-eight cows — two he had sold to the Italian — and there were twenty-six left. Twenty-five were found tubercular and were taken to Rome and slaughtered. The farmer went down with them and after he had seen what was done, he said if they would put the cows together and make them alive he would not drive them home. Twenty-five cows, making twenty-seven he had lost out of his herd. What followed is worth knowing. He went and bought ten cows and

he told me these ten cows gave more milk than his previous cows had and they ate less even than the tuberculous ones did. He could not get enough feed for his tuberculous herd. That meant more money out of his milk as he has only a small herd.

I buy the meat for my own family — was trained into that from my boyhood — so I buy the meat for my family. This week in the market I saw a nice shoulder of a pig. I told him I thought I would take that. "What are you going to do with it?" "Sausage." He said, "Well, that is a good way to get sausage. I wish the markets would furnish sausage like that. You know what we would have to charge a pound for that kind of sausage? Twenty-five cents a pound, for that is real pork sausage." Sausage was selling in that market for twelve cents a pound. Now I have talked to a man who is a manufacturer, who knows how sausage is made, and I was utterly astonished, the preservatives which are put into sausage. That is an example of our meat supplies. I wish no articles in the press about what I have said about sausage, I might get into trouble. I have had more trouble than that. If I can't speak to you about foods for the welfare of the people without being threatened with removal, removal would come only too quickly. I am not afraid of being removed as health officer. I am like Dr. Goler of Rochester. Remove me if you can, you will be smart if you do it.

Now, the health officer to-day is occupying what I call an exalted position. If he has courage, efficiency and ability he can do something. He can have a following, and men will not throw him down; I say that with our modern city government, with constant changing of the administration, the election of mayors who know absolutely nothing about health matters. I could go into the common schools and pick out boys fourteen and sixteen years old who would have more sanitary knowledge than the men elected mayors. They appoint a man as commissioner of public safety who knows nothing about health matters and he is the head of the health department. The health officer has mountains of loads to carry, and impassible barriers to go through.

DR. F. B. PARKE, Elmira — I will ask to be excused from the discussion, as it is 12 o'clock.

DR. JOHN H. GRANT, Buffalo — I have listened to the paper read by our health commissioner of Buffalo, which I find is very interesting. Some thirteen or fourteen years ago I was connected with the health department here, and have since co-operated with it in the department I represent — the State Department of Agriculture. I realize, regarding the source of milk supply in the large cities, that the health departments have a great problem to solve. A beginning has been made here, not only in Buffalo, but throughout the State, and it will take time to evolve a system that will stand and be satisfactory to the producer and the consumer. We have in Buffalo between five and six hundred sources of milk supply. Out of that number 110 were referred to me by the health department as containing a large number of bacteria. Most of them more than a million per c. c. Those 110 farms have been inspected by the inspectors of the department of agriculture here in Buffalo and a great many insanitary conditions were found. We have a system outlined for dairy inspector which an ordinary inspector without very much technical knowledge can fill out. Of course our inspectors are not as a rule doctors, but they are men who have been engaged in business for a great many years and are all civil service employees. They are interested in their work and I find from my ten years' experience that they do good work. Out of these 110 dairies, about 100 have been made to put their places in sanitary condition and 10 of them refused to, or neglected to do anything. We threatened to take these people into court, so they went out of the milk business. We were very much pleased that they did.

Regarding permits. We have, as Dr. Fronczak has said, regarded permits to producers who sell milk in cities as a very good thing. I think some system of that kind should be brought to the Legislature giving cities the authority to require permits to sell milk in the cities — [illegible] the cities from outside the city limits. I think [illegible]

department of the city will have more authority over them than they have now and they know from whom the milk will be received.

I find the manure conditions on the several farms is another problem. Manure is generally dumped outside the window and lies against the side of the barn and flows under the floor and creates insanitary conditions, especially in the spring and summer. As to the dump cart referred to in Dr. Fronczak's paper, I have found in my travels through my division that several have already adopted the dump cart and they find it a very convenient method of disposition of manure from around the barnyards.

Regarding sterilization. We find that the process leaves nothing in the milk but dead bacteria. My own experience is that that milk will not keep as long as the ordinary raw milk under careful conditions. So I don't believe in the sterilization process without regard to what it may take away from the bacterial count of the milk itself.

As to cans being returned, especially in large cities, to the producers. I think in Buffalo we have condemned about 1 per cent. of all cans being returned. That is, they have been condemned so that they cannot be used again for that purpose. As regards their cleansing by hot steam, if you have seams in those cans you cannot possibly sterilize them with steam. Because within those seams you will find a large accumulation of bacteria which the steam does not reach, so to have a can capable of sterilization you must have one without seams.

THURSDAY, NOVEMBER 17, 10 A. M.

FOURTH SESSION

SECTIONAL MEETINGS — FOR RURAL HEALTH OFFICERS

Presiding: Deputy State Commissioner WILLIAM A. HOWE, M.D., Chairman.

COMMISSIONER HOWE — Gentlemen, I want to welcome you again to this fourth session of our Conference. I want to congratulate you on being here and on being rural health officers of the State of New York, interested in matters pertaining to the health of the rural communities. It having been my privilege for fifteen or twenty years to serve in the same capacity as you are serving, I think probably I have a keen sense of the difficulties that confront you as rural health officers.

I want to state that, as in the past, the State Department of Health proposes to use its every resource to aid the rural health officers in improving the service which is being rendered to your people. I want to say to you further that the service is being increased almost daily. There is no question about the fact that the health officer of to-day is far more in advance of the health officer of ten years ago than is the physician of to-day as compared with the physician of ten years ago. You are progressing along rapid lines, and the Department stands ready to lend you every assistance in its power.

I want to present to you this morning and have you take by the hand one who has one of the warmest hands of good fellowship which it has ever been my privilege to grip, and I know that if each of you could meet personally Dr. Freeman it could but result in your profit and his pleasure. And I want to ask you personally to endeavor to meet Dr. Freeman, and in doing so you will meet a gentleman of fine personality and one whose accomplishments in health matters in a southern State are known throughout the nation. It is a particular privilege that we, the health officers of this great State, have in being able to listen to Dr. Freeman, of Richmond, who will speak to us on "Rural Sanitation."

RURAL HYGIENE

ALLEN W. FREEMAN, M.D.

Assistant State Commissioner of Health, Richmond, Va.

In discussing the subject of rural hygiene I need not remind so experienced a body of health officers that we are treating a topic which has been much neglected in the past. Because we have believed that our efforts were most needed and our field most fruitful in the cities, we have given little attention to the country, and until recently have failed, I think, to realize either the needs or the possibilities of rural sanitation. How our views have come to be changed on this subject, what the needs of the situation are

and what we may expect from careful work are in the brief the matters to which I would call your attention.

I think it may be assumed without argument that sanitary conditions throughout the rural districts of the United States are far from what they should be. It is true that this general premise is based upon the studies which have been made in the Southern States, where the prevalence of such diseases as typhoid fever and hookworm has made these studies imperative, yet my observations in the North and West, though somewhat limited in their extent, have not revealed any great difference in the sanitary habits of the people or in the sanitary situation. Indeed, the more I study the subject the more I am convinced that our problems and conditions are much the same, North or South. Of course, we have been led to believe that the undue prevalence of typhoid fever and hookworm disease in the Southern States marked a distinction in the sanitary problems of the two sections. Yet I believe the prevalence of these diseases is due more to the added factors of a warmer climate and the presence of the negro rather than to any fundamental difference in the habits of the people. The country people of the eastern part of the United States are for the most part descendants of the original stock from the British islands and the north of Europe. The sanitary habits brought with them are those of a people accustomed to a northern climate. These habits have proved fairly adequate to those dwelling in the northern part of our common country, but they have failed utterly among those living under southern conditions.

We of the South have come to realize that our long summers and our negroes rather than ourselves or our habits have made us dwellers in a subtropical climate and that the problems which confront us are subtropical problems for a temperate people — problems from which the North is spared by shorter summers and fewer negroes rather than by constitution or habit. Our underlying beliefs and constitutions are identical with those of your people; our problems are different in degree rather than in fundamental character, are aggravated merely where yours are modified. I make this comparison because it justifies, I believe, the application to your conditions, in part at least, of the remedies we

are employing in the South and brings home to you the problems which are common to North and South.

If we turn for a moment to the census reports for 1908 we shall have no difficulty in ascertaining the particular problems which confront us in working for improved rural sanitation. Typhoid fever, diphtheria and tuberculosis stare us in the face.

The following table from the census reports for 1908 shows the prevalence of typhoid fever in various areas of the United States:

Registration cities	25.8 per 100,000
Cities in registration States	24.5 " "
Rural parts of registration States	24.3 " "

When we consider that in most cases the inhabitants of our rural districts are not subject to milk infection, to food infection in general, or to any great extent to water infection with typhoid, the fact that they suffer practically as severely from typhoid fever as the residents of our cities indicates that the other factors, flies, filth and contact, must be unduly active.

In diphtheria, notwithstanding the fact that close crowding and intimate association are lacking, that milk and food infection are usually out of the question, we find the following report from the same source:

Death rate from diphtheria, 1908:

Registration cities	25.5 per 100,000
Cities in registration States	27.9 " "
Rural part of registration States	17.3 " "

It would seem that even the most rudimentary precautions under the usual conditions of rural life would prevent the spread of diphtheria in the absence of the factors mentioned above, but we find that the inhabitants of our rural districts suffer quite severely from this disease.

In tuberculosis we have another disease from which we would expect the inhabitants of the country districts to be much less heavily infected, living as they do without close associations, escaping the dangers of street dust, street cars, railway trains and public places, and exposed in fact practically to only the two factors of house infection and milk infection.

From the same report we obtain the following figures:

Death rate from tuberculosis, 1908:

Registration cities	170.1	per 100,000
Cities in registration States	169.1	" "
Rural parts of registration States	117.3	" "

Bearing in mind the favorable factors mentioned above, we must conclude that this death rate although lower than that of the cities is far from satisfactory for the conditions which should surround the inhabitants of country districts.

We must, therefore, face the fact that the sanitary administration of our country districts is for the most part not efficient in the North, South, East or West. We must recognize that, notwithstanding the fact that theoretically the prevention of disease should be far easier in country districts than in cities, in practice we only realize a slight advantage, and that the possibilities of prevention in rural life are for the most part not realized.

The causes for this condition while varying in detail in any two given localities depend fundamentally on the same factors in every locality, and may be summed up briefly as lack of education on sanitary matters and lack of organization of sanitary forces.

LACK OF EDUCATION

We have just come to realize that education, or rather popular information, regarding disease, its nature and prevention, is the most effective and easily available weapon of sanitary science to-day. Against ignorance, and stupidity, preventive medicine is helpless.

If we are to realize the benefits which the sanitary advances of the last generation have made possible to our people, we must secure a widespread comprehension by them of the fundamental truths underlying sanitary work, and a reasonable belief at least, in the efficiency of modern methods of prevention.

This comprehension and belief cannot be brought about in a day, a year, or perhaps in a generation, but even a beginning toward this end marks an advance in sanitary progress and a great aid in sanitary performance.

The general means of education of our country people have been so thoroughly covered on so many occasions, and are so familiar to you, that they need not be reviewed now. It is sufficient to say that every avenue through which the people are accustomed to receive their general information should be used for carrying to them information along sanitary lines.

In addition to these means we have found in Virginia that the district inspector is a well nigh indispensable agent of education. Working first with the physicians and then with the people, discussing the well and closet with them on the ground, showing them actually the means by which well pollution takes place, and by which infection is brought to the house from unprotected excreta, the inspector becomes a teacher and demonstrator whose labors are always fruitful.

In the hookworm work particularly we find that a personal visit to the farm with an inspection of its sanitary surroundings, the immediate microscopical diagnosis of any cases of hookworm which may be found, and a discussion of the whole farm as a sanitary unit, supplemented by literature which may be left at the time of the visit, is of the greatest value in convincing the people of the magnitude and importance of the work which we are trying to do.

I repeat, whether we depend on schools, newspapers, bulletins, lectures, exhibits or individual visits, our end cannot be accomplished until we have secured the real comprehension by at least a majority of our people of the principles which underlie our work and a real belief in practical preventive measures.

LACK OF ORGANIZATION

While of the two causes for present unsatisfactory rural conditions, lack of popular education is by far the most important, the careful student of conditions is forced to recognize the fact that there are certain fundamental defects in our present plan of organization of country health officials. The plan of organization varies of course with the various States, no two, perhaps, being identical. All, however, have certain features in common; all have certain common defects and all stand in need of certain reforms, without which efficient organization is impossible. As

I see it, there are three chief faults in our present systems, or, to put it in another form, there are three needs to be supplied. The first of these defects, and the one certainly found in every State, is the part-time employment of practicing physicians for health work.

No one recognizes so well as a State Health Officer the vast amount of work for the prevention of disease done by such men, done usually, too, in the face of popular prejudice, without adequate compensation, under trying technical difficulties, always arduous and usually dangerous. The voluntary effort of these practitioner health officers has been the mainstay of rural sanitary work for years, and too much honor cannot be given to them for their unselfish devotion to the cause of preventive medicine at a time when they alone realized its needs and possibilities.

It is, however, no reflection on such men or their work to inquire if the method is after all the best one under modern conditions, and if in the development of popular education and appreciation of sanitary work, their sacrifice is necessary or proper. We must recognize, first, that preventive work and private practice are opposed, economically, one to the other, and that in no other profession is a man expected to work constantly for the obliteration of his own sources of income. Then, too, the faithful and efficient performance of one's duty as a health officer often arouses the most bitter antagonisms, and creates permanent enmities in the community. If the health officer be a private practitioner, this may frequently result greatly to his professional and financial disadvantage. The private practice of medicine is not so remunerative that the average man can venture to arouse such opposition without endangering his own bread and butter. In addition, ethical considerations often prevent the efficient performance of duties involving relations with the patients of a fellow practitioner.

We must, too, keep in mind the fact that the enormous expansion of medical knowledge, seemingly endless as it is, requires every effort on the part of the private practitioner to keep abreast of the times, and that he has but little time to keep up with the equally rapid and extensive advance of its sister, sanitary science.

In addition, every one who has worked with assistants, for only a part of whose time one contracts, realizes the great difficulty in securing efficiency as compared with the assistant whose whole time and energy are at your disposal.

These facts have long been recognized in municipal sanitary work, and in every progressive health office to-day you will find the majority of workers to be trained men, out of private practice for all time, and devoting their whole energy to the work. The same rule should apply to the country. The rural health officer to-day should be, in my opinion, a physician, well acquainted with the territory committed to his charge, independent of local political influences, trained in the special work he is called upon to do, and giving his whole time to the work. Such a man need not be a graduate of a school of sanitary engineering, he need not even be a bacteriologist. Personally I should prefer him to be a good, sensible practitioner, whose interest in the subject has kept him abreast of the times and who is given a few weeks or months of special training in the field, in the practical details of the work. But he must, in any case, devote his whole time and his whole energy to health work alone. The amount of territory such a man can cover is much larger than is usually realized, and the salaries for part time work in two or three counties will often suffice for the employment of such a man, with a vast gain in efficiency.

VITAL STATISTICS

Next in importance to the personality of the health officer in influencing the efficiency of rural work, comes the matter of vital statistics. No man, no matter how able and efficient, can properly supervise the health of any district, however small, without accurate vital statistics for that district. You are fortunate enough in New York to possess such a system, well established, complete and reliable. The absence of such a system in Virginia constitutes a handicap to the work of our State Department which cannot be overcome until the system is established and in full operation. I believe that in general the lack of accurate vital statistics constitutes the most serious obstacle to sanitary progress in the Southern States to-day.

LEGAL ENACTMENTS

Third in order among our needs is that of better legal requirements. In common with every other branch of governmental endeavor, Public Health has suffered much in the past from an excess of law. Unenforced laws bring all law into contempt, and yet the statute books of practically every State are cluttered up with laws which we could not enforce if we would, and we would not enforce if we could. For effective rural work we need few laws, but we need these to be plain, easily comprehensible and capable of immediate enforcement. In most cases the statutes need only empower the State Health authority to make regulations, thus making the law flexible enough to cover the changing needs of the times, and subject to immediate test in the courts. Such regulations should however be as few and as simple as it is possible to make them, and every effort should be made to enforce each one to the letter.

RESULTS POSSIBLE FROM EFFECTIVE WORK

If we secure efficient health organizations for our country districts along the lines I have been bold enough to suggest what results may we expect? Can we hope to reduce the excessive mortality from preventable disease to which we have referred? For an answer we need only look at the cities with their declining rates from all preventable diseases and their even more significant decline in the general death rate. We must then realize that the same efforts in the country, under more natural habits of life than are found in the crowded and artificial life of our cities, can but yield even greater results.

From our experience in Virginia, I am quite sure that the installation of proper means for the disposal of night soil, and the education of the country people as to the dangers of contact infection, will result in lowering the typhoid death rate in rural districts to one fourth of its present proportions. Such a campaign has been conducted in Virginia for the last two years and though limited in its extent, and far from complete in its details, it has resulted in lowering the number of reported cases of typhoid fever thirty-five per cent. Education regarding consumption, with the establishment of a country home for the in-

tractable open cases and the improvement of the ventilation of country homes, especially the sleeping rooms, should cut the death rate in rural districts far faster than we are able to do in the cities. In diphtheria, the use of early laboratory diagnosis, release cultures, effectual isolation, and above all, intelligent epidemiological work, offer hope of prompt and substantial reduction in the attack rate. In every branch of preventive medicine the country invites careful and conscientious work.

The country health officer, whether he be a practicing physician or an expert with a diploma in public health, has opportunities unequalled in any other field for both research and practical preventive work. The field is just opening, and those in early will reap the greatest rewards, not only in money and reputation but in that far more valuable thing, the consciousness of real and effective service to the increase of human happiness and the lessening of human woe.

COMMISSIONER HOWE — The hour is early, and we purposely left a lot of time so as to have a heart-to-heart and hand-to-hand talk on "Rural Hygiene." Some of the speakers were selected to open this discussion, but we would like to see all of you avail yourselves of an opportunity to discuss the questions presented, and we will use all the time that is available for general consideration of this topic which comes home to each one of us. The speakers marked down to open the discussion are Dr. Charles F. Butler, Dr. B. F. Chase, and Dr. G. Scott Towne. Is either present? (No response.)

DR. KREB, Cape Vincent — I did not undertake to enter into any discussion, but the question arose in my mind that if the State Department is furnishing these receptacles, as they are in this State, how can a man get receptacles enough for a whole school or a community without the State Department being somewhat committed to the plan?

DR. ALLEN W. FREEMAN — If I may answer that directly: There is a little intimate history connected with that. The county was rather close to Richmond, and we are a little lazy in getting to the office down there. The janitor usually opens up about 8 o'clock in the morning, and was in the office when this doctor ran in and said that he wanted 100 diphtheria tubes. The janitor tried to communicate with Dr. Williams, but he could not get him on the phone, and as the fellow was very insistent, the janitor gave him the tubes, and we could not catch up with him again until the cultures came back.

DR. MAGILL, State Department of Health of the State of New York — The reader of the paper seemed to me to insinuate or imply that it was such a simple matter to develop an investigator of typhoid epidemic, that the student of common sense, layman or grocery clerk, could become a very valuable investigator in an epidemic, rather than some qualified person. That touches me on a sensitive point. I think the door should be closed to anyone without medical training. My experience, together with that of the Chairman I am addressing, I am certain has convinced us that it is an exceedingly difficult matter to undertake to do this work in a conscientious way and arrive at a scientific conclusion without men trained in medicine. And in a great many epidemics of typhoid fever in the country, it would be exceedingly

criticisable in a health department, I should think, that would put such a delicate matter in the hands of an untrained person, that is, a person without medical education.

Dr. Van Hoesen — Mr. Chairman, I would say that we have in our county, and in all of the dairy counties, a very good point which helps to educate the people, and enables us to quarantine typhoid much easier than elsewhere. We are a dairy community, as I said before, and the health authorities of the city of New York do not allow any milk to be shipped from dairies or from anyone employed in dairies from a place that has typhoid fever, nor can it be handled by any member of his family. Inasmuch as the authorities of the city of New York will not consider receiving such milk, it is easy for us to convince the people in our communities that typhoid is a contagious disease that needs instant attention. The people are not allowed to come into contact with the patients, nor to go about the premises any more than is absolutely necessary. This has proved the best doctor that we could have, and I am convinced that if the sections from which the milk supply of large towns and cities comes could be made to view it in the same light, that typhoid is considered dangerous under those conditions, why I think it would soon stamp it out.

Dr. Bullard — I want to say something on the lines of this discussion as originally laid out and presented by the paper to which we have listened with so much interest.

It is very pleasant for a large number of us to meet here together and to all of us who come here it is a matter of personal benefit. But as suggested by the reader of the original paper, we go home and the demands of our own practice prevent many of us in the country from giving that time to the matter that is necessary or desirable, so that our communities could get the benefit. In a way these conferences have been a splendid thing; but I think these large conferences are evolutionary and transitory; I think that the time is coming in the near future when there will be fewer health officers in the rural districts. There are many towns with only four or five thousand population in which there are two or three villages, each sending a representative here, and they return home and each municipality is bearing the burden of expense of sending a health officer or member of the board of health here. The populations of the towns and the villages are perhaps almost identical, and while I enjoy being a health officer, I realize that in the near future it is inevitable that we have got to abandon the territorial divisions in which we now work. The health officers in the sparsely settled districts should be men who receive enough more than their present pay so that they can give it more time and attention, and have jurisdiction over more inclusive territory. We must recognize what is coming in the future, and prepare for the inevitable, prepare to make the change with less pain and resistance on acount of these men who will have to retire in favor of those who show special fitness for the work. I think that is one of the best points that has been brought out. I am going to take that back home.

I have received some splendid ideas here, and here is an important one: Not only are the country newspapers and the people being educated by the press, but the moving picture is also being used extensively. It is a great educator through what they see at these different entertainments; but I do not get enough out of it unless I am very specially interested. Therefore, in the more sparsely settled districts there must be fewer health officers, larger salaries and more work for them to do.

Commissioner Howe — Are there any other remarks on this discussion?

Dr. ——— — I have been for a long time thoroughly imbued with the idea that the health officer has got to be a health officer and not at the same time a private practitioner of medicine, and in the matter of education I would pass this as a suggestion:

For several years I have been attending these Health Officers' Conferences, and enjoy them very much, and when I return to my home I have a public

meeting and get the public out and give them in a brief manner the points that we get here at these conventions; and I use that as a means of education for the public in the community. And I must say it has been a means of education in my district.

DR. —— — After having water from a spring or well which has been condemned because of containing typhoid infection, shall we allow the family or anyone else to use the water from that well or spring until it has been re-examined and declared to be free from infection?

DR. BRITTON — One of our brothers here mentioned about barns and houses in connection with typhoid fever epidemics. I belong in the southern tier of counties of this State, and we are connected and interested in the milk supply of New York city. The board of health of the city of New York is strong and positive in its rules and regulations as to the condition of the dairy from which milk is taken, and the barns must be ventilated in such and such a way, so much light admitted for so many cubic feet of interior, and they must be whitewashed. But this New York health department doesn't go far enough with those people so as to make them keep clean in their houses. I saw a place thirty-six hours ago where you could throw your coat against the side of the house and it would hang there.

Now, we must bring pressure to bear upon people who have houses of this character. They must be clean in their homes as well as in their barns. I do not think any health officer on earth can prevent typhoid under those conditions.

DR. YOUNG — I want to call the attention of this convention to the matter of cesspools. That nuisance exists in every village. We have them, and in our village we have a peculiar geology to deal with. How shall we get rid of that most insanitary thing, the cesspool? I have tried to find some method of making a half-sanitary cesspool at least; but it seems to me the State of New York should employ a sanitary engineer to devise a cesspool which can be used in our rural districts and small villages, where we do not have perfect drainage or sewerage. It is the insanitary condition of our cesspools, as we have them in our villages, that makes the trouble.

COMMISSIONER HOWE — I will ask Mr. Horton, our chief engineer in the Department, to talk on that subject later. Are there any further remarks?

DR. LAKE — I was greatly interested in this paper, and there are some points, it seems to me, gentlemen, that should leave a deep impression upon us. To-day throughout the country the cities are pretty thoroughly protected in every way, as regards the public health, and yet the rural districts or territory on which this paper treats is, in my opinion, the largest source for the continued spreading for infectious disease, and every health officer of every locality is largely responsible for this.

I am not saying this in the way of throwing blame upon those officials, but I think we are not insistent enough to the people, and in relation to carrying out the things which should be carried out for the protection of the public. It should be education, and yet what are we doing in the rural districts in the way of education? It may be said with the utmost truth that apathy exists everywhere, and yet I think enthusiastic health officers will imbue their boards of supervisors with the opinion that what he wants done should be done if he will go about it right. I do not think it is necessary that he should cover a large territory. These conferences are informal, and health officers in every town and locality come to them, and all we want is for that fellow representing each particular town to get his people out and inform them about these things we discuss and consider here.

Then there is the examination as to the condition in the schoolhouses outside of large towns. See to the conditions of ill ventilation. Many of the children in these schools have diseases and are in fit condition to infect others. Have those children examined.

Again, let us look into the milk supply of those places — how much of it

has been examined? How many stables have been looked over by the inspector or the health officer of the rural districts? What do you know as to the character of the milk coming in from every rural district? That is all in the province of the health officer, and he should make his board see that he is equipped to carry that out. The result would be far reaching.

MR. BRADTON, Homer — I rise to ask for some help: We are now undergoing an epidemic in Homer, eighteen cases having been reported since the first of September, the population being 2,500, or less, and our private water supply has not been examined in some cases. In my investigation in this case, I thought it was largely due to colon bacilli carried by flies; I think that is what is making our trouble. But I believe that colon bacilli produced some of our cases, and if they are not pure typhoid they become so.

DR. SELDEN, Catskill — Don't some of this trouble come from a lack of reporting on the part of physicians? Once in a while in going around I get a typhoid germ and I go to a physician and have a talk with him, and the next time he has such a case he will report the case, and then I go and examine the premises and do what I can toward teaching these people what is necessary.

Last spring the Department made an examination of a number of boarding-houses throughout the Catskill region. I think all of the houses had twenty-five or more boarders' accommodations. The people from the Department made recommendations in one case which were not carried out. Since the close of their season on Labor Day, twelve cases of typhoid fever have occurred among the people who patronized that boarding-house, one of whom was the proprietor himself, and I think probably it will do him good. The case was reported; I went to the place and looked it over. The only wonder to me was that intelligent people, who go out to the country for rest and recreation from the large cities, should go to such a place. But they do, and when they have trouble they blame it on the health department.

Within a very short time there had been a number of cases of scarlet fever there too. I say a number — probably it was five or six — in the lower end of our town, which, as you know, is largely given over to the foreign element, and contains a class of people that it is difficult to manage because of the difficulty of making them understand what you want them to do. There are Poles there that do not understand each other, they are from different sections of their common country. They have some fourteen or fifteen different forms of expression, and some of them say that they cannot understand even their own talk. I do not know about that. But a good deal is chargeable to the conditions under which these people live.

I have had less trouble with the foreigners as a class than with a certain class of Americans as to contagious diseases. An American shrugs his shoulders and says he is as good as anybody else. "Why don't you make these people clean up?" Why don't you do this and why don't you do that? Within a week I was called into quarantine a house where there were two cases of scarlet fever. I went to the village and talked to the people. They understood the situation perfectly, and they did all they could to protect the neighbors. When we came to investigate the origin of that trouble, we found that a young woman of this household had worked out in another part of the town. While there — she was there about two weeks — she had a sort of rash. Some fifteen or twenty people were in the boarding-house, and people came from the city with children, and the children all got sore throats. They did not call a physician, because these people who brought it there knew exactly what it was, and they knew also if they called a physician something would be done to interfere with their freedom. This young woman finally recovered after leaving there, and one day at home she took out a skirt and shook it out in the house, and within a week three children, all there were in the house, came down with scarlet fever. It is pretty difficult thing to guard against infection against any of these diseases if you do not know where to locate it.

I have started my campaign of education by talking with the truant officer. He came in on Monday and he told me of the condition where these

men worked, and fourteen or fifteen families are keeping their children out of school, absolutely refusing to send them there as everybody had scarlet fever in that neighborhood, as they put it. The truant officer said, "What are you going to do about it?" I said, "You let it lie quiet for a week, and then we will go down together and see what happened." He was a sensible sort of a fellow and he did that. We went down and did the best we could. He will go back there and explain the situation to these people, and they will understand what is to be done in the future. That is the beginning. Of course it must be followed up closely.

DR. EVERTS — I am located in a district where the milk supply is brought into Buffalo, and they send their inspectors out there throughout the country too, and they condemned two of the dairies in the country, one on account of dirt and one on account of insanitary conditions, and the farmer immediately loads his milk into a wagon and carries it over to a creamery. It seems to me that when milk is unfit to be sent to the city to be drank as milk and used in that way, there should be some way to prevent it going to a creamery to be made up into butter

DR. EVERETT — Someone referred to the difficulties regarding dissemination. I want to mention one or two matters which have occurred in my practice as a health officer rather than as a physician. During the past summer we have suffered from one or two epidemics. I had twenty-eight quarantines and eighty-two cases of contagious disease. During the epidemic of scarlet fever which appeared earlier in the season everything was placed under rigid quarantine, and I have tried to make it a practice that when I had to quarantine any place that no disease should escape from those premises. The exceptions are very rare, but in a neighborhood where the scarlet fever was prevailing I was notified by an attending physician that there were four cases of scarlet fever that had developed in four children on the same day. I found on examination that it was true; and I inquired where it was that they contracted it. They said they had not been anywhere. They had been right there and they were so afraid they would get the scarlet fever that they had not allowed anybody to come there. It is rather strange where that came from. I found upon inquiry that a family had moved away and moved everything except the cat, and the cat came there with a kitten, and the children liking the cat made a playfellow of it, and as soon as it got there they were all delighted with the cat, and they were caressing it and the cat had kittens, and they all got scarlet fever, kittens, children and cat.

THE CHAIRMAN — We will now call on Dr. Freeman to close the discussion.

DR. ALLEN W. FREEMAN — I have little to add except to make myself clearer on a few points. As to the student investigators, I probably have not made myself as clear as I had intended. I had not intended to convey the impression that we would take students who were just beginning, or clerks. Our students have all been medical students who have completed at least their second year, and as far as their availability for public health is concerned they are entirely as useful as if they had attended clinics for years. Of course, being students, they are cheaper than physicians, and they are more enthusiastic and energetic than the practitioners we have used for the same purpose. As to their efficiency, we have reports on the prevalence of typhoid fever in two counties of Virginia, which until recently were free from typhoid and in which a sputum investigator has investigated every single one reported. And I must say they constitute a good piece of epidemiological work.

Now after the bacteria. I think it is a pretty dangerous doctrine for a health officer to contend that typhoid is not caused by a germ in feces. There are some things we do not know about medicine, but we do know that typhoid spread is spread from discharges from sick persons, and if we leave that position we must drop all typhoid preventive work and stop it to-morrow.

As to closing and condemning a well spring there is no general statement that can be made upon that. We concluded as a result of most careful work

that comparatively few springs have become infected, and very few wells. We find that flies and filth and fingers are the great spreaders of typhoid fever, and if we can get those things cleared up we do not have trouble with typhoid. The dairy communities will not improve their water supply. There is no way to improve except by protecting the well-cup and removing privies. Typhoid is cut down with cleanliness. I have in my hand here what I regard as a most important contribution to sanitary science. It is a design of a sanitary privy designed by the officers of the Marine Hospital Service at Washington; it is published in the last, or the next to the last, Public Health Reports. We are testing this out in Virginia, and it seems to me that all the conditions of a sanitary privy are complied with in this. It consists especially of a water-tight barrel that is sunk in the ground about one-half of its height, and the barrel is half full of water and on top of the water there is some heavy oil poured. From that barrel a pipe may run to another barrel, which is also water tight, and the barrel has special divisions. The feces and urine go directly into the barrel and a small amount of material particles go over into the second barrel, but that equals in volume only the actual volume of the feces, less evaporation, which is a very small amount. In the laboratory they had one of these in a room, and they had not ten gallons of material to dispose of in a considerable time, although it was used by a large number of people.

DR. ——— — What laboratory is that?

DR. FREEMAN — The Hygienic Laboratory. This is a cut of a device which may be of interest to some of you (passing around printed illustration).

DR. ——— — How about septic tanks?

DR. FREEMAN — I never saw a cesspool I could approve of, but the septic tank is such a broad subject. This is not a septic tank.

As to the matter of colon infection or typhoid or intermediate cases of typhoid, we are convinced in Virginia that whether it is colon, or whatever may be the intermediate organism, the material that is dangerous and which gives us typhoid and hookworm diseases is human excrement, and if we look after that the exact nature of the organism does not make much difference. We are trying to dispose of that excrement in a satisfactory manner.

I am sure I am very much obliged for this full discussion of this very brief paper.

THE CHAIRMAN — Dr. Freeman, I want to say that no further assurance should be necessary on the part of your hearers of their appreciation of your paper than the discussion and the attention which they have given to it.

Now you have been hearing for several years the views of the next speaker — he is the voice in type, as it were, of the Department. There is, perhaps, no one man in the whole Department who has wielded so constant an influence over you as Dr. Cole, the efficient editor of "The Bulletin."

DR. HILLS COLE — Gentlemen, I have a bad reputation in the Department. They tell me I have a faculty of finding jobs for others, but none for myself. I have to get up these conference programs, and they tell me I always find a place for this man and that man, but I always leave myself off the program.

I have a few announcements to make at this point:

First, this afternoon is left as an open afternoon. Three different opportunities are offered you for the employment of your time. Those of you who care to, can see something of the meat inspection work of the city of Buffalo. Dr. Heath who has charge of that work for the city of Buffalo will take those who wish to follow up this feature; he will take charge of them and take them around this afternoon.

At the close of the meeting last night Dr. Fronczak showed some pictures of the work which is being done by his department in the city of Buffalo. Those pictures will be repeated here this afternoon at four o'clock, and again to-morrow night at eight.

The Medical Officers of Health have a special meeting this afternoon at five o'clock at the Hotel Iroquois.

There will be a tuberculosis clinic held in this hall at two o'clock this afternoon by Dr. Pryor, and anybody caring to come he will be glad to see present.

We are a little late — but we will hurry as much as we can.

First of all, with regard to the BULLETIN, we are very anxious that it should have as wide a circulation as possible. Unfortunately our purse does not permit us to send it to everybody to whom we would like to send it, so that we feel the first thing to do is to send it to those who would like to receive it. We believe every physician should have it, but we do not want to send it to a physician unless he wants to read it. If you have any physicians or laymen interested in public health matters, and particularly members of your Board of Health, we should be pleased to see that they get a copy of it monthly; and in order that they may get it, if you will write to the Department and give us such names, we will put their names upon the mailing list.

The division over which I have the privilege to preside must arrange conference programs. It is hard for us sometimes to decide on the topics that you would like to have discussed, and when the conference period comes around I wish you would bear that in mind and send in any suggestions you have to make. Just send the word to us at Albany, and say that you would like to hear discussion on such and such a topic.

Recently a special edition of the BULLETIN was mailed to every physician in the State, and if you know of any physician who did not receive it let us know and we will mail it to him. That issue gives an outline of the work of the Department, vital statistics, registration of births and deaths, and other things which it is important to get physicians to know in order that they may act in harmony with you in the work of the Health Department.

We are working in Albany on a series of public lectures, the idea being that we can frame up the text of a lecture and supply lantern slides, so that if any of you want to talk to your own people on subjects of sanitation we shall be glad to offer some assistance. We may not be able to send a lecturer in person, but we will help you with lantern slides and the text of a talk on the slides. When this is further advanced, notice of it will be given in the BULLETIN.

Please do not forget that we have a library in Albany with books on sanitation, and we are glad to lend them to the health officers of the State.

You may be interested in knowing that we have recently started a weekly news letter service, sending to the press a weekly letter dealing with sanitation and the work of the State Department of Health. Any of you having access to your local papers, if you would like to have any assistance from the State Department of Health in helping you out with statistics or anything of that character please remember that we are at your service for this class of work.

POLLUTION OF STREAMS

By THEODORE HORTON, C.E.
Chief Engineer, State Department of Health

I believe that if any of you gentlemen should attempt to give a ten-minute talk on the "practice of medicine," you would appreciate my position in attempting to discuss the subject of stream pollution in this short interval. In fact I propose to let you do the discussing, for if I can succeed in giving a mere outline of the subject in this short time I will feel that I have accomplished my object.

Foregoing further introductory remarks then I will proceed with the fundamental proposition that there is not a town or village in the State that has not flowing through it for a greater or less period of the year a stream of some measurable size. I believe that I may state with equal safety that every one of these streams receives in some way or another pollution of some character; be it large or small; be it dangerous or not. This pollution may for example come from sewer systems or industrial establishments; from cesspools or vaults; overhanging privies; garbage and manure piles and what not. Some of it may produce nuisances and some may be dangerous to health, and it therefore becomes necessary for us to differentiate rather sharply between these various classes or sources of pollution in order that we may understand and judge correctly their relative importance or significance.

1. Perhaps the simplest classification is that between direct and indirect pollution.

By direct pollution I mean the sewage and wastes that enter the stream directly without any intervening space or barrier which might result in a partial or complete purification. This would include sewerage systems and house drains and wastes from factories, overhanging cesspools and miscellaneous wastes discharged directly into it. It is evident that this pollution is the most serious and is in fact the cause of some of our worst nuisances and dangers to health. Further it is the class of pollu-

tion specifically enjoined by the Public Health Law and which the health officer has the greatest difficulty in dealing with.

By indirect pollution I mean the sewage and wastes that are not discharged directly into the stream but reach it after flowing over or through the soil, or through sewage disposal works where opportunity is afforded for it to be partially purified. This would include sewage from cesspools and vaults which are situated some distance from the stream; effluents from sewage disposal works; drainage from barns and hog pens; and the washings from fertilized fields. Although this pollution is not usually as objectionable or as dangerous as direct pollution on account of the partial purification that takes place, it *may*, nevertheless, be objectionable and dangerous, *especially* when the stream is used for water supply purposes.

2. Again, we may classify pollution as that which is organic and that which is inorganic, i. e., pollution that contains any of the parts, substance, materials or products of animal or plant life, and that which does not.

The organic pollution is perhaps more important, for it is this matter which often contains the deadly germs of disease and under certain conditions makes sewage objectionable or offensive. This organic matter is characteristic of most but not all classes of pollution, but especially of domestic sewage and of certain manufacturing wastes such as paper and pulp mills, tanneries and creameries, etc.

Now this organic matter is as you know decomposable and putrescible. Some of it is quite stable and decomposes very slowly, while some of it is very unstable and decomposes very rapidly. This decomposition, of course, takes place by aid of certain bacteria. When there is plenty of oxygen present the aerobic bacteria perform the work and the organic matter becomes oxidized or nitrified without the production of gases. When, however, there is not sufficient oxygen present or after it is all used up by aerobic bacteria, then another set of bacteria, the anaerobic, do the work, and this decomposition which takes place in the absence of oxygen is attended with evolution of gases which give rise to odors and nuisances. In other words, so long as oxygen is available in the water for the bacterial process to be

carried on then there will be no nuisance; but the very moment this oxygen becomes exhausted, then gases are given off and odors arise, and a nuisance may be created.

The inorganic pollution, or what may be considered mineral matter, may be of manifold character and from different sources, but is usually characteristic of certain factory wastes or refuse, more especially chemical works. It may be, for instance, poisonous acids which may kill fish life or even human life. Again it may have characteristic odors, such as of certain chemical compounds or wastes from certain factories, and produce a nuisance in this way. Finally, it may be largely inert matter in suspense which may cause deposits and unsightliness in a stream. This class of pollution does not, however, decompose and does not give rise to offensive organic odors such as that which arises from organic pollution.

3. Finally, pollution may be classified as that which is pathogenic and nonpathogenic. These are assumed terms and are meant to define or differentiate between pollution which is of human origin and that which is not. This classification is, perhaps, the most important for upon it depends the public health.

Pathogenic pollution may be considered that pollution which contains the excreta and washings, or any of waste products from the human body and, of course, *may* contain germs of disease. This pollution is associated with the contents and discharges from sewers, drains, cesspools, vaults, etc., and, if it reaches a stream used for water supply, it may spread infectious disease unless the pollution is removed by filtration. Many of our streams and most of our rivers receive this class of pollution and so long as it is not used for water supply there is no great danger. The fact to remember, however, is that a very small amount of it discharged into a stream may seriously contaminate it and give rise to epidemics of infectious diseases.

The nonpathogenic pollution, or that which does not contain wastes or washings from human beings, is, of course, not dangerous from a sanitary standpoint. This kind of pollution is characteristic of factory wastes, when these wastes are not mixed with human wastes. It is very important to remember, in regard to it,

that, although these wastes may often be the cause of some of our worst nuisances, they *do not* in themselves give rise to infectious diseases and are not in themselves a menace to life.

I have laid considerable stress, therefore, upon a classification of pollution, for I feel that it is essential and necessary to know the character, importance and significance of each in its relation to the production of nuisances or to the danger to public health.

THE CHAIRMAN — Does anyone wish to ask any questions of Mr. Horton? (No response.)

DR. BULLARD — Somebody here a short time ago asked the question as to what they were going to do in towns where they have cesspools, and as reply we have been handed a description of the sanitary privy, and we have been informed that this matter should not be carried into public streams.

Now the sanitary privy works nicely out in the country, but it does not fill the bill in certain villages where they have a water supply, perhaps, and would like to have the sanitary conveniences in the house, and have no means of disposing of the sewage save in that way, or under ground. I believe this is a very vital point, and people putting in tanks in the house and water supply, they want to know what to do with the material after it leaves the house. I think sewage disposal plants can be constructed in nine out of ten cases.

DR. O'DONNELL — I am very much interested in this question of cesspools. I am located in a rural district in a town of 1,500 inhabitants, and the question arises in my mind: How are we going to dispose of our own human fecal discharges, and the water we bathe in, and the water our clothes are washed in?

Modern houses are connected with a sewer, and they go down about ten feet for gravel, and they give us no trouble later. We want to know, if the engineer will tell us, if we are contaminated by our own discharges, how is the best way to dispose of them? We are not aspiring to a sewage system in our place as yet — we have a water supply that is about 250 feet elevation and we do not feel that our discharges are going into the water that we are drinking; still, I would like the sanitary engineer to explain what danger we are running of infecting ourselves from our own sewage discharges and how should the people build such houses in the future.

MR. WHITNEY — I am vitally interested in that question, and I would like to ask Mr. Horton, if he will not answer that question fully in the MONTHLY BULLETIN.

THE CHAIRMAN — We will now move on to the last number of the morning — Dr. Magill, whose work is evidenced frequently before the health officers of the State.

THE STATE LABORATORIES

By W. S. Magill, M.D.

Director of Laboratories, State Department of Health

Mr. Chairman and Gentlemen: I will give a statement as to the laboratory work, what we want you to do, and what we want to do for you.

We have three laboratories connected with the State Department of Health. There is the antitoxin laboratory at Albany, and the State Hygienic Laboratory, and a branch of the latter laboratory at Ithaca. I can dispose of Ithaca by saying that it is used for sanitary water examinations for a particular field or division of the State, and is not different in its work than if it were located at Albany.

All correspondence concerning examinations of water at Ithaca should be addressed to Albany; it is merely located at Ithaca as a matter of convenience, and it is not an administrative office.

The antitoxin laboratory at Albany prepares the tetanus and diphtheria antitoxins. The tetanus antitoxin is issued to every health officer of the State, and every effort is made by the Department of Health to have such officer keep both antitoxins on hand, and to prevent the development of tetanus. It has happened far too often that health officers are telephoning or writing to the Department for tetanus antitoxin for emergency purposes, and they quite forget that they are expected to have this tetanus antitoxin on hand. It is the duty of the health officer to have it on hand, and have it used in every case of open wound of that kind. How can you urge the use of tetanus antitoxin if you haven't it on hand? That is the way we control the record of efficiency on our work. When we find that towns have not made use of the tetanus antitoxin for two years, we have not much confidence in the officer there.

The antitoxin is prepared by injecting toxin into a horse, and then it is drawn out in the blood of the horse. This is tested by United States tests as to its power. We put up two prophylactic doses (1,500 units each) in a vial, and also in larger vial — 10,000 units to be used as a curative dose.

The diphtheria antitoxin is far more extensively used in this State, and is supplied in bottles containing 1,500 units in some; and others 5,000, and where a lot of people have to be immunized sometimes in bottles of 10,000 units. For this immunizing purpose, it is in bottles, the physician distributing the dose, to the amount in his judgment it should be and using his own syringe.

For therapeutic uses it is distributed in a syringe package, the syringe containing about 3,000 unit doses. When used the package should be returned to the laboratory as we have a plunger which can not be drawn out so that the syringe can be used again.

During this year, 5,000 syringes failed to be returned to our laboratory, and that cannot be because of breakage, as we seldom have a break among them. I think someone is negligent, because in each one of those packages is a small slip, yellow for tetanus and blue for diphtheria. It is scarcely to be realized that with the medical profession of this State, when each physician taking this antitoxin furnished by the State, subscribes his name and pledges his honor to return them, that the laboratory is scarcely receiving 10 per cent. of those reports.

I have undertaken to write to every man who has sent incomplete reports, and I can see a notable progress during this year. It is, however, only in 10 per cent. of reports sent in. I find that we must resort to writing to every man who has signed a receipt, for that package, and ask where the report is. That should not be necessary. There is honor and efficiency, and there must be discipline in the medical profession. When you have promised to report the results of the use, we expect the realization of that promise generally, and not once in ten times.

The question often comes up as to whom diphtheria antitoxin shall be supplied by the health officer, and we say that the health officer should have our fresh supplies always at hand. By the tests of our laboratory, the antitoxin remains satisfactory for use for about one year, if kept in a cool place. If you have a doubt as to the efficiency of your antitoxin, as to its being good, send it back to us, and we will supply you with fresh antitoxin. Now, you should have it always on hand — unfortunately you do not all have it; as 600 towns of this State made no use of the antitoxin last year;

is, 600 last year out of 950 towns — that is a very high percentage, of misses.

You have the antitoxin on hand, and the first thing to remember is that this has proved itself the most important life-saver in diphtheria; that its use prevents the possibility of anybody contracting the disease, if they are injected with a prophylactic dose in time. Further, that if the tetanus antitoxin is used in any suspicious wound, it prevents absolutely the appearance of tetanus in that wound; and I have pleasure in reporting that of the last 18 cases of lockjaw tetanus, after convulsions appeared, and treated with antitoxin, we had eight recoveries.

Now, the therapeutic effect of diphtheria antitoxin depends on its immmediate use. Our statistics show that where diphtheria antitoxin is used in the first 24 hours, there is only a trifle over 3 per cent. of fatality; in 48 hours, it jumps to 5 per cent; another day to 9, another day to 15 and 25. Now, then, the physician that has it in his power to supply antitoxin and to save one hour, if he does not do that, is morally responsible for a fatality that occurs. Bear that in mind.

The object of this department, as announced by the Commissioner of Health, is to help those who cannot help themselves. The patient must have antitoxin. If the physician attending that case and the drug store there, haven't it on hand, it may be a millionaire's son, still it is your duty to help that man as he cannot help himself.

Now, then, where people can secure their antitoxin and have the means to pay for it, then they should. The State service is not to be used and abused as a charity. But because a man can pay, if he cannot obtain it, is no reason why he should not be furnished it by the State officer. Where it can be used to advantage, it must be used, but it is never to be abused.

This is the antitoxin service at the present time, and that is determined by the limitations of our antitoxin laboratory. We have been preparing and striving to the best of our ability to furnish this year vaccine for rabies. We are overburdened, however, with work and need money, and that has progressed so slowly that it is not ready at this time. I am waiting now to have three weeks of perfect quiet in the laboratory, in order to start my series. Then we will have the rabies vaccine for distribution.

We have, further, the State Hygienic Laboratory, the functions of which are: The sanitary examination of water — diagnosis of infectious diseases, and special pathological work. We undertake the sanitary laboratory examination of all public water supplies. We have about 240 of them in the State. We do that as frequently as possible. That means money and a plant whereby we can reach and take these samples; and that is the routine work of the laboratory. We examined — I do not remember the figures — but last month something over 300 analyses in the month, so you can see to what extent we are busy, and in our opinion a public supply should be examined by the State Laboratory at least once a month. Now, bear that in mind and see if we examine the 240 sources of water supply of this State, that we would be at the maximum of our capacity, and could do very little other than water examination. We have by law the examination of water supplies to all State institutions, and we undertake — although it is not required by law — new supplies proposed for communities; we undertake to prepare for them a proper statement by which they can go before the Water Supply Commission. That thing in itself would carry us over our capacity for water analysis.

That brings up a little item which I have put here at the suggestion of the chairman — the question of well water. I do not think there is anything that occurs in the laboratory and the health officer's work which is so much involved as the question of the examination of a well. We quite understand that the rural health officer is quite alone in the community, and that he may forget that there are far more important problems in the water examination than John Jones' well. We have 9,000,000 of population in this State, and if we undertake the examination of the wells in the State that are merely suspected, why you will see the difficulty we will have in trying to do anything else.

My experience in water analyses for a great many years, in many communities, brings these conclusions: That it is seldom that the laboratory analysis of a well water has any utility. You must remember, if you have a well that is taking drainage from your garden, or from your barnyard and various other things of that kind that occur in the country, that you will have the pollution which our laboratory finds sufficient to condemn the water. But still that does not mean disease there. If it is a fecal pollution

from cattle, that does not mean even a dangerous source of typhoid fever to the consumer. Now, suppose you have a typhoid fever in a family, and you want that well examined. Remember that pollution was two or three weeks earlier than the appearance of the sickness, and that the damage was done that much before you were notified of it; before you learned of the injurious character of the water it had very likely disappeared long ago, and testing the well now you may find it to be good water.

Or suppose we will take that water and send it on and have it examined, and the report that would come back would be that fecal organisms were present in it. That does not prove that the well was your source of typhoid pollution; and if we condemn that well, you as well as the Department are liable to be considered arbitrary. It is proper that if you have a well that is getting barnyard and garden drainage, or that is not properly covered, that you should correct that. Then, when you have a well where the local conditions are satisfactory, then is the time for the laboratory conditions to come in and see if anything is happening underground. We cannot undertake all the wells in the State that should be examined, and we cannot say we are doing you any great good by examining such a well.

Furthermore, you heard this morning from the first speaker that it is the exception that typhoid fever is carried from a well; that typhoid is carried by this alliteration — flies, filth and fingers. The water examination of such well cannot be undertaken by this Department, that is, analysis of well water as a possible source of typhoid fever, until every other source of infection has been eliminated. When you have done that, then it might be well to look into the water.

We issue a little green circular called "Water Analysis." The conditions are in the manual or circular, and they were repeated in a special number of the BULLETIN of last August, and we have made every effort to make clear to all what we can do and what you should do when you want our service.

There is scarcely a day that we do not have three, five or six applications for containers for water, in which they do not conform to the rules. They do not tell us what they want or why they want it.

Now, we have health officers who telegraph, "Send three containers for water examination," and we do not want to be arbitrary, and we ask why the man telegraphed. Sometimes he answers and sometimes he does not. Sometimes he sends down a sample of the water in containers of his own. Now, I ask that you will carefully read the literature of the Department and the conditions under which the laboratory must be used for water examination. If those conditions are arbitrary or irrational, we would welcome any suggestions; but unless we can better them, we ask you to please comply with what we have set forth.

The State Department also makes other examinations, but the bulk of these are as to the presence of diphtheria germs, and the examination of blood serum for widal reaction, and, as far as we can, the examination of stools. Every health officer is requested to keep supply of our culture outfits, as we call them. That is a little glass tube, in which is the proper blood serum, and another little glass tube with a swab for taking specimens from the throat. They are both in a tin tube, and that is put in another outside tin tube. There is a slip for filling out, with the blanks for information, and that we supply to every health officer. It is necessary for him to keep those fresh, as the blood serum will dry out, and as soon as it is dry and wrinkled — not a smooth, white surface — it is no longer fit for use. In that case it should be exchanged. We supply a sputum outfit (container); that is a glass bottle, thoroughly corked, with directions in a tin box, with a secure top, and that is, like the other, packed in the outside tin box with a screw top. That is for the sputum, providing for its transportation by mail to the laboratory.

Then we have the widal outfit for diagnosis of typhoid, a small glass tube with a needle for puncturing the ear. That has a single wood box. The double boxes for diphtheria and sputum specimens are fixed by the postal regulations of the country, and we therefore have complied with them and cannot do anything else.

Now, it is forbidden to send such materials as those which these ordinarily contain through the mails except in such an outfit as we provide to mail them. If such material is sent in any other than that way the person is liable to a fine up to $200. Now, then, we are insistent upon the health officers using our outfit. They

are prescribed by the United States postal regulations, and we are protecting the health officer from fine. It is a penal offense, and yet, in spite of that, there is not a day goes by that we do not see some one who has sent a diphtheria specimen improperly packed, which is sometimes smashed by the postal clerks stamping it. Such a health officer should be retired from the profession or put in jail. Our widal outfit is a capillary glass tube and a needle to puncture the ear and get a drop of the blood, which is then drawn into the tube and sent to us, after sealing the ends. There is nothing infectious in that, but we must have the name of the patient and details supplied on the accompanying blank. You must heat the end of the glass tube to seal it. Some of these glass tubes have been made so hot that the blood inside was charred. Such heating of the cells results invariably in destruction of the specific reaction properties of the serum by that degree of heat. You would then get a negative result where it might have been positive, and the fault is through the overheating. Just heat the little end enough to seal it.

Now, in requesting reports of these examinations for diagnostic work, cross off "Mail" if "Telegraph" is wanted. The health officers sometimes cross off both; and it seems to me simple enough, for here are two words on our blanks, "Mail" and "Telegraph." Leave the one act which you want us to do in full plain print, and cross out the other one. Cross out the one you do not want us to do with your report.

It may be of interest to you to know that our laboratory functions night and day, holidays and Sundays. Its work is going on night and day, so there is no delay in any part of work at the laboratory. The special work on the diagnosis is examination of some intestinal worms and tubercle bacilli in milks, etc. Our water inspector seeks these specimens, and in that way we are gathering statistics as to the extent to which milk is infected. We will accumulate a bulk of that data in time.

A day or two ago I attended a meeting of municipal engineers in Rochester, and the cry of every person of experience and influence in that learned body was the necessity of education of people as to their needs and the proper application of municipal improvements. Yesterday I attended a meeting of the State Board of

Charities and also a meeting of the Lunacy Commission, where every one spoke of education. This morning the first paper here and everything else that happened here speaks of the necessity for education. You health officers are educating your communities. Last fall the Commissioner of Health called to your mind the establishment of courses for health officers; and in Albany we would say that we are giving four-day courses in bacteriology, and sanitary bacteriology and chemistry of water and milk, and we are giving every quarter — the next one will be on the 7th of December and last for four days — a special course in conjunction with the Division of Engineering on the purification of water and sewage. I think our bacteriological courses are well known to you, and they are going on every week. Every health officer is welcome any week that he can come. It is not necessary for him to announce his arrival; he can come any time. If he comes on a Monday, the four first days of the week will be on the bacteriological course, and the last four days of the week on milk and water. And every three months, as I said before, it will be a four days' course in conjunction with the Engineering Division on the purification of water and sewage. This is a splendid course. There will be a laboratory demonstration of the principles involved, the lectures in a general way handling the topics of water purification and sewage purification by the Engineering Division, and then there will be an investigation and practical demonstration of typical plants, sand filtration plant in Albany, mechanical filtration plant at Rensselaer; then there will be an examination of sewage purification of one type at Ballston Spa, and a further one at Saratoga.

Now, if the health officer shall take this course, he will have explained to him the fundamental principles underlying the purification of water and sewage, so that by that course, and seeing these different plants in actual operation, he is in a position to act as an expert adviser for his local community. I hope many of you will come to that course, as you can there see what you need to learn for the betterment of your communities.

You will remember also that last year it was announced that a special effort would be made to bring about the establishment of county laboratories, and I think it is the duty of every health

officer to make a wide propaganda for the establishment of such a laboratory in his particular county.

This year we have brought out about six, but there are sixty-one counties in our State. We must make more rapid progress than that; otherwise it will take us ten years to get them established. I will not take up your time to say why we want the county laboratory, but I wish to engage each one of you in this effort to get a county laboratory. I will point out one thing; you are aware that the law requires that any person that will present a specimen of sputum to his health officer is entitled to its bacteriological examination to determine an infection of tuberculosis. Now, remember, the statistics of the tuberculosis agitators. We should have to make at least four examinations of each case, and you can see that we should have something like from eight million to twenty million examinations of sputum in the course of a year. Such a thing is out of the question to expect from a State laboratory, and yet it is proper and fitting work for a county laboratory.

FRIDAY, NOVEMBER 18, 10 A. M.

FIFTH SESSION

Presiding: DR. W. S. MAGILL.

THE CHAIRMAN — In opening this session on "Communicable Diseases," it gives me great pleasure to introduce a colleague to you, gentlemen — Dr. John A. Amyot, Director of the Laboratories of the Provincial Board of Health, Toronto, Canada.

THE LABORATORY AS AN AID TO DIAGNOSIS

BY JOHN A. AMYOT, M.D.

Director of Laboratories, Provincial Board of Health, Toronto, Canada

MR. CHAIRMAN, LADIES AND GENTLEMEN — I have come here to-day, not to defend the laboratory, it needs none; I have come to recall to you the many things it can do for you in your public health work. I am not going to tell you about new things, only to remind you of the many ways in which it can be useful to you — the laboratory that this great State has provided for this work and which is available for you all.

It has facilities for routine diagnostic work, for the making and testing of sera and for research work. By routine work is meant the work that is done day by day in the procuring of exact data for the commoner communicable diseases, to control the time of isolation in these and to search out their origin. This is available to all the health officers of the State and to practitioners of medicine.

There is not time to point out all the things the laboratory can do for you; suffice it to take up a few of the most prominent.

DIPHTHERIA

This is a germ disease, not very well appreciated. Much yet is to be learned with reference to it, but sufficient is known to be of great value to you. The laboratory has supplied this.

Provision is made for the sending of swabs to the State Laboratory for two purposes, diagnosis and release from isolation. This swab necessarily ought to be properly taken. It should be taken

from the lesion, no matter where the lesion is. There is where the organisms are in greatest numbers and at their best. Don't just put the swab into the mouth, but find the lesion and rub it on that. It is quite possible for you to directly make the examination of a swab so taken at your own home. It only requires a little practice for you to become familiar with its character and staining qualities. In properly taken swabs you could make a positive diagnosis in 90 per cent. of your cases at the first examination. In doubtful cases, repeated swabs might have to be taken. In this way you could avoid a certain amount of delay.

Usually, for one reason or another, the health officer finds it better to send them to the State Laboratory. There the bacteriologist, if he were sure the swab had been properly taken, could make a direct examination, and where it is requested does so, and reports to you without any further delay. But in routine it happens so frequently that they are not properly taken, so that the organisms are apt to be few in number. It becomes necessary for him then to have them multiply so that he can get a sufficient number of them to be sure of their character. He cultivates them on a suitable medium for from fifteen to eighteen hours. They develop certain very diagnostic characteristics during this growth. However, there is the objection, delay, but it is best to be sure. He reports the presence or absence of the bacilli of diphtheria. He does not say the case is diphtheria or not diphtheria, simply that the organisms are there or not in this particular swab.

The physician, when he has seen and studied carefully a few cases of diphtheria, can make a diagnosis of diphtheria in a large percentage of cases. There are cases in which he would have very little doubt. Some clinicians on this account come to the conclusion that they can diagnose nearly all cases of diphtheria, and that diphtheria is diagnosable on clinical data. They will say the membrane points it out, but false membrane is found in other diseases besides diphtheria. Streptococci, pneumococci and other organisms besides diphtheria bacilli will give rise to membrane formation. We have diphtheria often without membrane, in some cases only a slight exudate, in others only inflammation. Where exact observation is made it is found that a clinician from bedside data alone will only diagnose correctly about 70 per cent. of his cases; in other words,

he is out on 30 per cent. of his cases. Send those doubtful ones, if you are to choose, to the laboratory, better send all if you can. It has also been found that in those cases where the practitioner concludes it is not diphtheria that he is again out in as many as 40 per cent. He calls it sore throat or tonsilitis, and so on. Forty per cent. of these will on laboratory examination show diphtheria bacilli. The presence of the diphtheria bacillus does not necessarily mean that the patient is suffering from diphtheria. He may be suffering from inflammation in the throat due to any of the other organisms I have mentioned. The clinician must combine the laboratory's report with his clinical data to make a correct diagnosis.

But for you health officers the finding of the diphtheria bacilli in the smear from the patient is a very important thing. Given the presence of the organism and clinical signs, you have to deal with a subject dangerous to the public health. The organisms are at their best.

In cases where there are no clinical symptoms the organisms may be much attenuated, usually are, but still are often enough as virulent as in clinical cases. Until it can be shown to you that the particular organism in question is not virulent, your duty to the public is evident. Even if they are not now virulent, they may, with change of environment, become so. At least, this has not been satisfactorily disproved as yet.

Keeping in mind that accidents may happen to the swab in transit to the laboratory, if you receive a report of absence of the diphtheria bacillus and you still find clinical signs, make sure; send other swabs until you are sure. Don't let tonsilitis cases go about without being sure; 40 per cent. of them are diphtheria.

Individuals having diphtheria bacilli in their throats should be isolated until they are shown to be free from them. Diphtheria bacilli often persist for days, weeks or even months after all clinical signs have disappeared. These are always dangerous cases. They become carriers and may spread the disease very widely.

In many localities a time isolation is made without reference to presence or absence of organisms. After four weeks 20 per cent. of the cases still show organisms in the throat. The absence of clinical symptoms is unsafe as a guide to release from isolation,

more so than the time limit, especially in these antitoxin days when the symptoms disappear so early. The average time of disappearance is twenty-five days, but even then 20 per cent. or more of cases still show organisms. This the laboratory has pointed out and it is still the one to finally settle when the organisms have disappeared in any given case. You have a fine tool in the laboratory, you health officers. One negative swab is not sufficient though to liberate on. As high as 20 per cent. escape detection, as swabs are generally taken, on the one examination. This would give us a false security.

When two consecutive negative results with at least twenty-four hours intervening are obtained the percentage of escapes drops down to 1 or at most 2 per cent. In many infectious hospitals it is customary to seek five consecutive negative results before allowing the patient to go. In many cities the infectious hospital is under the supervision of the health officer. Don't let the convalescent go until you are sure the organisms have vanished. It is not a pleasant thing for a health officer to release a patient from a hospital and then find three or four other cases crop up in houses to which the patient went. The swab method is your weapon and the surest method you have. It is a method of precision. You cannot depend upon clinical symptoms for the release of a patient who has had diphtheria.

The laboratory can help you out in another condition. Diphtheria seems sometimes to be endemic in schools, children's homes and other institutions. Outbreaks frequently repeat themselves and are very difficult to control. You isolate your clinical cases. Others keep breaking out. You have carriers to deal with. Take swabs. You can pick them out. Keep them apart until they become free. In one hospital I investigated for this trouble the data pointed to the nurses as the possible source of repeated outbreaks. We took swabs. Found two showing typical diphtheria bacilli. One of the two only had had sore throat, the other was a carrier. We had them removed. There have been no fresh cases since. In another institution nearly one-half of the inmates showed definite or suspicious organisms. Diphtheria had been breaking out there on all kinds of occasions. We separated the infected from the non-infected. It took months, and now every newcomer is held until

two consecutive negative cultures show absence of diphtheria bacilli before he is put with the rest. These nonclinical cases, through drinking cups, spoons and direct contact, keep such organisms passing from one to the other. It isn't to the plumbing, etc., that you must direct your attention, but to infection carriers. Irritable looking fissures at the nares or corners of the mouth should make us suspicious. Swabs will show if organisms are present.

TUBERCULOSIS

The examination of the discharge from suspected lesions of the disease will show us if it is tuberculosis or not, always, of course, keeping in mind does this belong to the patient. If the patient has a discharging lesion he is dangerous to the public. Give the laboratory a fair chance, though. Send material from the lesion, wherever it is, not just nose secretion or stomach contents, but expectoration; if it is a pulmonary case, material from the lesion. There will be a percentage missed even then. Take repeated samples and again, always from the lesion.

When you know your patient is discharging tubercle bacilli you know he is a source of infection, and that he will be until all discharge ceases, and often that will take a long time, but you know what you have to deal with.

Those coming in contact with this patient, dressing the wounds or looking after him, run the greatest risk. Any one using a cup after such a patient runs extreme risk. Those who come in and breathe up the dust of the room do not run the same degree of risk as those who are next to the patient. They do not take up organisms as do those who take articles from the hands of the patient, wash his linen, etc. The laboratory points out these sources of infection to you and indicates exactly where your work is to be done.

There are diseases which simulate tuberculosis so exactly that clinically they cannot be distinguished. Let me cite a case which will bring this home. A patient with all the clinical signs of tuberculosis was sent to a sanatorium, though no bacilli were found in his expectoration, and this happens in real cases. He had expectoration and at the sanatorium it was frequently examined, but the bacilli of tuberculosis were never found, but certain organisms

which resembled the diphtheria bacilli, and these persisted. The patient was given diphtheria antitoxin with only slight improvement. Diphtheria bacilli have two kinds of toxin, the intra-cellular and the extra-cellular. The antitoxin neutralizes the extra-cellular as it finds it in the fluids of the body. The other acts locally, and in this particular case was the one chiefly in action, setting up local pulmonary inflammatory reaction; so the case was attacked from this side. A vaccine was made from the organisms isolated from his expectoration and given to him. He recovered completely after two short periods of treatment.

Only the laboratory could have shown that this case was different from others.

There is still field for investigation along this line. During the last two years at the Toronto General Hospital Prof. MacKenzie has shown on autopsy that some six cases that had clinically been thought to be acute diffuse pulmonary tuberculosis were actually cases of blastomycosis, when only the closest observations by laboratory methods could have demonstrated the true cause, a pathogenic yeast. The results obtained in the few years that laboratory methods have been used compare well with the results obtained in the previous two thousand years of clinical methods.

TYPHOID FEVER

The regular routine in these cases is to make the Widal test with the blood of the suspect. The laboratory reports the presence or absence of this reaction, not that the case is typhoid or not typhoid. Typhoid cases do not show the reaction throughout the course of the disease. It is found on some days only or late in the case or not at all. When a positive reaction is found it is typhoid in 95 per cent. of the cases. When negative it tells you nothing, unless repeatedly so. Don't say it is not typhoid because you get a negative Widal report.

The examination of the blood for the organism would be the more exact method of finding whether your patient is suffering from typhoid fever. It is usually difficult to get a sufficient quantity of the blood to the laboratory in good condition (without contamination). Then, again, in typhoid it is only in the early stages

of the disease that you can get any good percentage of presence of bacilli. During the first ten days you may get them in from 90 to 95 per cent. of the cases. Later on you miss them. They have become localized. For use away from hospitals this method is hardly satisfactory for general application. The future may develop means of carrying blood culture methods into general use as the Widal is now done.

Where the laboratory can do something else for you in the direction of diagnosis in typhoid is in the examination of the excreta for the bacillus. This is especially useful for the health officer. For the clinician it is not so useful, for cases not suffering from typhoid at all may carry the organisms in their intestines or other organs. These carriers are a nuisance to the public. The laboratory only can determine the carrier. You can, by collecting evidence, get suspicious of an individual, but only the laboratory can tell you if he is actually harboring the bacilli of typhoid fever.

OPHTHALMIA NEONATORUM

The examination of the discharge will give you positive evidence. For the patient's sake it is the clinician who should do the examining at the bedside, and thus save time. These eyes may perforate in twenty-four hours. The information is useful to the health officer in that he can protect those about.

SPECIFIC CEREBROSPINAL MENINGITIS

Meningitis may be due to various organisms. The specific type is due to the diplococcus. Don't send specimens of blood for the search. The organism is located in the meningeal spaces. This is the fluid to send for examination. Have it taken aseptically. It is the old story again, from the point of lesion. The laboratory cannot always tell you, but it can in the majority of cases, whether it is present or not.

It is possible under conditions to make examinations of secretions from the upper nasal cavities and get results which will give you a hint but not positive knowledge. The positive evidence is to be gotten from the cerebrospinal fluid.

RABIES

Nearly every one bitten gets a gun and shoots the dog — don't — tie or lock him up. When a rabid dog bites it is because he is delirious and is due to die within a very few days. His symptoms will become definite. Then you have positive evidence, and within three or four days at most, usually earlier. If the dog is still well after ten days and is taking his food well, then there is not one chance in thousands that he is rabid. I know it is not always possible to tie up a rabid dog, but in most cases it is quite possible. Always do it when you can. Your patient is not going to lose materially by the delay.

Of course, if you get word that the dog is shot, then do the next best thing, send the head to the laboratory. If it is simply a case of where animals have been bitten, get track of all these animals for future reference. The laboratory will make inoculations into animals from the brain substance of the head you sent in. It is the most certain method, but it takes a long time, usually sixteen or seventeen days. It may be three hundred, as happened out in Minnesota.

Where human beings have been bitten this delay is too long. More rapid methods, though less certain, must be resorted to, and the search for the Negri body is the one now generally resorted to. We do not know whether these are the causes of the disease or only the result, but we know that they are present in the nerve cells of the brain of the infected animals and only present in this disease.

These bodies are present in the nerve cells and it is these that have to be examined. If the brain has undergone any advanced putrefaction the examination would be useless, the cells are disintegrated. A diagnosis of any value can only be made if the bodies are found in the cells. So pack the head in such a way and as early as possible so that it will not undergo putrefaction in transit, so that it will not run out on the car floor and have the dogs that pass by later lick the fluid up. You must protect the public. If the bodies are reported present treat the case as one that might develop rabies. Your laboratory will supply you the vaccine to treat him with and give you all the necessary instruction or treat him for you.

MALARIA

Much of our old malaria was typhoid. But when you suspect malaria the laboratory can help you out. Do not send blood in a bottle. The examination cannot be made satisfactorily from this. Make a smear preparation of the blood as you would if you were going to have a differential white blood cell count made. Don't apply any chemicals. Let it merely dry in the air. It is necessary that the red corpuscles be in good condition, for it is in them that the organisms are located.

GLANDERS

Send material from the lesion on sterile swabs, which your laboratory will supply to you on application. Don't send the blood. The Mallein test is the best one to use.

ANTHRAX

Send the blood or a piece of the spleen or, again, a piece of the lesion, but don't put any chemicals on them. Cultures have to be made from them.

So far the laboratory can do nothing positive for you in measles, scarlet fever, chicken-pox or infantile paralysis. You will have to depend on clinical data and history.

WATER ANALYSES

These are made for sanitary purposes. They are biological and chemical. I want to discuss only a few points in this connection.

The colon bacillus.— The presence of this organism in a drink-water does not say it is the cause of typhoid fever, simply that material of intestinal origin has got into the water. The laboratory cannot tell you whether it is from man or animal. The history and the local circumstances only can tell you this. If it is from man, then see if there are any possible typhoid cases about or carriers of this organism. It is next to impossible to find the typhoid organism in drinking water. So far the colon bacillus is the best indicator of fecal contamination of water we have. Nearly every well has them present. Nearly every well is contaminated, and it is not surprising. How often have you seen a properly covered well, one that would not let contaminated water get into it.

receiving the benefit that is derived from the laboratory in their immediate vicinity. You have heard the speaker state and tell you how necessary it is for you to get your specimen early to the laboratory to get early returns or benefit. The health officer should take the initiative. You must lead. Unless you do so you cannot expect anyone else to take your place in this particular field.

Now, to get right home, we have a laboratory in our county which has been in existence for four years. Here I have the fourth annual report of the board of supervisors of our county. What have they done for the citizens of our own county? We have put them in the position where they can help themselves to get rid of contagious and infectious diseases, and we know that results have been accomplished far in excess of any expense paid out by the citizens of the county. The citizens are the beneficiaries, and there is no asset so great to any community as good health.

All in the world you have to do is to prove to your board of supervisors that it will be an asset to your county, and you will have no trouble getting the laboratory. Of course it may be said that a great deal of this work we do is done by the State gratis. That is perfectly true, but follow that up and you will find that you have done four-fifths more work if you have a laboratory at hand than by sending it to Albany or elsewhere.

What do we do at our laboratory? We examine for the bacilli of diphtheria, and the importance of that you have heard from the previous speaker. The next thing is for tuberculosis. If you have many specimens to be examined, they cannot be examined satisfactorily if you have to send them away. You know it is difficult to pay the postage. If you have the laboratory at hand you will have the work done and you will have the disease stayed.

We have the Widal test for typhoid. We examine also for diplococcus and streptococcus, etc.

In ophthalmia neonatorum, how long does it take you to collect a specimen from the patient and to get returns? If you have your laboratory at hand you can get your results in a very few hours.

We examine also urine. This is an excretion examined by most physicians. I believe if you have a laboratory such as we have you would have many specimens of urine examined, and you would find in that way many cases of doubtful diagnosis and constitutional troubles would be shown with their data that you want determined but cannot obtain otherwise.

We also examine human milk. The human milk is for the ascertainment of the fats, etc. We make bacteriological examination of the water, of our water supplies and the wells supposed to be infected. We also make examination of feces, and you know the importance of examining feces in many diseases. Then the blood counts; and we also have tests for malaria.

In this tabulated report for our county, which is a small county of 52,000 inhabitants, we have a laboratory that does the work of our own county and also the work of another county, the county of Yates, which immediately adjoins us. Under a contract with the other board of supervisors we make the examinations for them. We have found that our bacteriologists can do it, and it is a source of a revenue to us and a saving of expense to them.

Our total number of examinations last year was 921. That is more by 104 than we had made in any preceding year.

Everything that pertains to the public health is examined free for our own county — sputum, diphtheria, water suspected of contamination, all of those are free to our people, and it leaves the physician and health officer to advise where there is any suspicion of this trouble, and to send in specimens; and we get them in that way.

In the case of Yates county, we charge them a nominal fee for all work done in that county. We employ a bacteriologist at a salary of $1,500 a year.

Gentlemen, if you will get your health officers in your county together, with the physicians, get them interested too, you will have no trouble in getting your appropriation if you get them all to work as a unit.

Our laboratory is a little building 12 by 20, and it cost $1,000 and the equipment cost about $500. We are self-sustaining. We, of course, pay the

bacteriologist's salary from the county. The supervisors of every county can pay a salary for a bacteriologist. When we started we came up against this: That one of the board of supervisors inspecting our plant said there was no way of paying for the bacteriologist, so we created a new official, called a bacteriologist, and he is paid as any other official of the county.

THE CHAIRMAN — For further discussion, we have Dr. W. W. Waite, of Syracuse, bacteriologist of the city there. Is Dr. Waite present? (No response.)

Would Dr. Hennington, bacteriologist of the county of Monroe, contribute something to the discussion?

DR. HENNINGTON, Rochester — In reply to your invitation to speak, Mr. Chairman, I respond as a representative of one of these smaller local laboratories that have been described by Dr. Hallenbeck, namely, the Monroe County Bacteriological Laboratory. There are now five or six such laboratories maintained by the counties of our State.

The paper before us by Dr. Amyot has been very instructive and valuable, and I can add only one feature, and that is, to narrate a recent experience with a diphtheria bacillus carrier. Our laboratory has been examining the new admissions to a large boys' institution, which last winter had a diphtheria epidemic. We wished to help to prevent a recurrence of that. Among them I found a definite carrier, three weeks ago, in the case of a boy in apparently good health. Comments surely are not necessary after that.

THE CHAIRMAN — In closing the discussion on the first paper, I wish to express my personal appreciation and that of the Department and of the audience to Dr. Amyot for the very clear and plain and explanatory paper on the use of the laboratory. I wish you would keep in mind his statements regarding the examination of well water and milk. It is hard to have our health officers understand our limitations, but if you will remember this very careful expression of the limitations you will have no trouble.

I will ask Dr. Amyot if he has anything further to say in closing the discussion.

DR. ——— I want to ask for information, speaking of the consecutive swab cultures, when the first is negative, how soon should these consecutive swab cultures be taken and sent?

THE CHAIRMAN — I will undertake to answer that, as it is a matter of procedure of this State: I shall call attention to the fact that the action of the Commissioner of Health with the unanimous recommendation of the medical officers of this State has brought about the adoption of a rule, that no case shall be liberated from diphtheria quarantine without two bacteriological examinations that shall be found negative. That is to say, when the case is to your clinical mind recovered you would take a swab culture and send it to the laboratory and get two negative cultures before the quarantine is raised. You can get your answer on the second day, and after getting the second one, which may be taken on the second day, the quarantine can be raised if you have two negative ones, and the regulations have been complied with. Until you get two negative cultures on successive days, signed by the laboratory, you should not raise the quarantine.

DR. MAHONEY — Suppose it is a month?

THE CHAIRMAN — There is a case on record on Long Island that lasted four months.

DR. MAHONEY — Was that carried out in practice?

THE CHAIRMAN — Yes, by the health officer.

DR. MAHONEY — Anywhere else?

THE CHAIRMAN — Probably.

DR. ——— — The line between private and public health is very narrow. What is the line of demarcation?

THE CHAIRMAN — So far as the infectious diseases are concerned, laboratory examination makes no distinction; everyone has the right. It is only when you have tumors and the examination of nephritis secretions, something which cannot be called for the general good, it is an individual case. The public health is dealing with infectious materials; that seems to be a good line of separation.

DR. ——— — Is cancer eliminated from the infectious diseases?

DR. AMYOT — For the time being, yes.

THE CHAIRMAN — I think you can meet this question if you will remember that the State laboratory is to do the work gratuitously, if it protects the public from disease. If it is a question of solving a problem of interest to the patient alone, it is a private matter.

I desire again to call attention to the course afforded by the State Department at Albany in bacteriology, these matters touched upon by Dr. Amyot — which course is given every week in Albany, from Monday until Thursday — a four days' course. Every health officer is welcome there for the entire course of any week or any portion thereof. If you will let me know of your arrival beforehand, we can give you probably better attention.

The last four days of the week are devoted to a course in sanitary water examination, or the chemical and bacteriological examination of water and milk. That begins on Wednesday and runs the last four days of the week.

In addition there is arranged, every once a quarter, the first course to begin December 7, a course of four days in water and sewage purification. This is by the co-operation of the engineering and the laboratory divisions of the Department of Health. It begins with a talk on the fundamental principles involved. There are lectures by the sanitary engineers, and demonstrations and visits to typical plants. In this case there is a visit to a slow-sand filtration type at Albany; to a mechanical filtration type across the river at Rensselaer, and to a type of sewage purification at Ballston Spa, and another at Saratoga. So we give you a complete demonstration of the plants used for these different purposes. We think we can give you that in four days, so that every health officer taking the course will understand the needs of his community, and can be called in as an expert adviser. Every health officer is invited to take that course, and what you learn there will help you solve the problems related to those subjects in your communities.

Proceeding to the next paper, I have the pleasure of introducing to you Dr. E. C. Levy, the health officer of Richmond, Va.

EDUCATION vs. COMPULSION IN SECURING REPORTS OF CONTAGIUS DISEASES

By E. C. Levy, M.D.
Chief Health Officer, Richmond, Va.

In the development of local health departments there have been thrust upon them many matters which are by no means distinctly health problems, but which by common consent have to be attended to by health departments everywhere. There is perhaps no health officer in the country who would not, if the matter were entirely in his own hands, get rid of many of these matters and employ the funds thus saved for inaugurating or enlarging work which would undoubtedly do far more for the cause of public health.

Unquestionably the most legitimate field of public health work is in connection with the control of contagious diseases. In order to secure such control a fundamental necessity is the securing, from the physicians of the community, complete reports of every case of contagious disease. Important as this is it may still safely be said that very few of our local boards of health in the United States are at the present time securing anything like complete reports. This is sufficiently evidenced by the ratio between reported cases and deaths. When, for example, we see the annual report of a health officer in which the number of cases of typhoid fever is only two or three times, or even five or six times, as great as the number of deaths, we may feel confident that only from one-fifth to one-half of all cases of this disease have been reported.

Perhaps no city in the country was worse off in this respect than Richmond five years ago. Upon entering office four and a half years ago, the writer began at once to investigate the cause of this delinquency and seek the remedy. Ordinances of the city of Richmond fully covering the case, and imposing a fine of $10 a day for each day's failure to report were on the statute books, but so far as could be learned no physician had ever been fined.

Although having ample legal recourse in dealing with physicians who failed to report their cases the writer did not believe that this furnished the real solution of the problem. It seemed to him that

great as was the import of this matter yet the cordial support and co-operation of the two hundred doctors of Richmond were even more important, and a plan was sought whereby results could be secured by other than court proceedings.

In order to accomplish this it was first necessary to ascertain where the difficulty lay. It seemed to the writer that two causes were chiefly operative: (first) the fact that the practising physicians were not fully acquainted with their duty in this connection, and especially that they did not know just what contagious diseases they were required to report: and (second) that a physician with a case of reportable disease either found that he did not have the necessary blank for reporting, or else that he had placed his supply of blanks where he could not lay his hand on them.

Acting along these lines, the first move was to send a circular letter to each physician, acquainting him with the ordinances and asking his co-operation. This was followed up as soon as possible by sending to every physician the outfit box here exhibited. This box is rather ornamental in appearance and no physician objects to giving it a prominent place on his desk. In this box, as sent to the physicians, there is a full supply of all forms needed by him in complying with our ordinances, including a requisition card by which he may secure an additional supply of any forms before he has used the last one. On the inside cover of this box are printed extracts from the various ordinances in this connection.

It is not easy for any physician to lose this outfit, which furnishes him immediately a full list of reportable diseases, and the necessary forms on which to report them. The cost of these outfit boxes (which was 12½ cents each) is saved over and over again by the fact that all postal cards, stamped envelopes, etc., which they contain are safeguarded against loss, while formerly it was nothing unusual for a physician to get fifteen or twenty postal card blanks of various kinds, use one or two of them and not be able to remember where he put the rest, thus necessitating a new supply.

The box itself covered two of the hypothetical causes of delinquency and made it easy for each physician to report his cases if he wanted to. The next thing seemed to be getting all physicians in the proper spirit for reporting their cases of contagious

diseases, and this proved as easy as the other two matters. Practically the entire problem in this connection was solved by having the physicians understand the importance of their reports. Obviously they could not feel that their reports were important unless something happened in every case when a report was received. The writer believes it to be utterly unfair to busy practitioners to ask that they take time — however little — to send in reports when they have every reason to believe that nothing is done with them after they are received.

Naturally no health department would regard this as the only, or even the chief, reason why active work in connection with contagious diseases should be done. Yet letting the physicians know what is being done makes them not only willing but anxious to co-operate.

If the health officer regards the securing of complete returns of contagious diseases as really a matter of very great importance, he will naturally hold this view only if he uses these reports as the basis of active work.

What then should a health officer do with these reports? One of the first things, of course, is to send a list of contagious diseases each day to the superintendent of public schools, for uses too obvious to mention. Next, every case of contagious disease (except perhaps chicken pox, mumps, whooping cough, and measles in off years) should be immediately visited by a medical inspector who gets full data of every kind in connection with each case. These data are used in the office for many purposes. From them the origin of many cases can be at once made apparent, and measures taken to prevent further spread of the disease.

Chronological charts of each disease are kept in order that a comparison may be made with previous years, and also because chronology is frequently one of the main points to be considered in determining the cause of any outbreak. Spot maps are kept thoroughly up to date to show the geographical distribution of each disease.

These maps are kept by means of tacks of different colors corresponding to certain important features of the case. These spot maps as kept in Richmond are of two kinds for each disease; first the color map showing cases actually on hand each day; and second

a map on which the location of the cases are shown for the current year. For the latter map rubber stamps are used instead of tacks. On such a map hollow circles represent recovery of current cases and solid circles represent fatal cases.

One of the most useful devices employed in our Richmond office is a blackboard showing at all times the number of cases on hand at the beginning of each day of the current month, the number of cases reported on that day, and the number of recoveries reported. From these the number of cases on hand at the beginning of the next day is calculated and posted. This board has not only space for the current month, day by day, but also has space for a monthly summary of cases on hand, reported, and recovered, for each of the preceding twelve months. On the lower part of this blackboard are tacked clippings from the annual reports of preceding years. The health officer thus has always before him a summary of cases on hand, and reported, and can at once make a comparison with the corresponding period of other years. This gives him the means of replying to inquiries from outside, but most of all it enables him to compare results with results of previous years.

Besides what has been mentioned above all diseases are plotted on cross section paper to show the curves by months and by years.

A large percentage of the physicians of Richmond are in the health office one or more times each year, and it is always made a point to show them something of this work. Every physician who has once seen this is duly impressed with the importance which his own reports have in the general scheme, and he leaves with a strong desire to help the cause.

A large percentage of our physicians, moreover, are now learning that they may themselves use our tabulated information as a great aid in diagnosis. In doubtful cases the physicians may save considerable time by knowing whether or not a given disease is especially prevalent in the city at that time, or especially prevalent in the neighborhood of his case, or in the school attended by his patient. This again makes each physician desirous of contributing his part to a scheme which he himself finds most valuable.

The results in Richmond of working along the above lines have been all that could be desired. It is exceedingly exceptional for us to learn of any case of reportable disease in our city, having

a physician in attendance, which is not already on our records. This is well shown by the fact that last year we had 377 cases of typhoid fever the outcome of which was known at the end of the year. This included cases on hand at the beginning of the year and terminated cases reported during the year. During the year we had 28 deaths from typhoid fever, giving a case fatality of 7.4 per cent. for the year, or 13½ cases to each death. These figures must be convincing as to the completeness with which typhoid fever cases are reported to the Richmond Health Department. These figures are in strong contrast with those of the year before the reorganization of the Richmond Health Department. In that year (1905) there were 40 deaths from typhoid fever out of only 164 reported cases, giving a case fatality of 24.4 per cent., or one death in every 4 1-10 reported cases.

The writer believes that work of this kind which has proved so successful in Richmond furnishes the real key to securing complete returns of contagious diseases, and at the same time retaining the friendship and support of the medical profession. Without these latter not only must any health department fail to do its best work but the life of the health officer will also be made miserable. Of course aggravated or repeated failures on the part of physicians to comply with the laws must be reported to court, but in Richmond there have been but three such cases in the past four years.

Every attempt to secure results through the courts invariably leaves hard feelings, and on the whole the results are inferior to those secured by co-operation and education, while this latter course also maintains friendly relations with the entire medical profession, whose solid support is so frequently required by every health officer when dealing with complicated questions which he has to handle.

DR. HILLS COLE — Those newly in the field can teach many of us who are old in the field. I know it was an inspiration to me when I attended a meeting in Richmond to hear Dr. Levy give a talk on this same line, and it was for that reason I was instrumental in having him scheduled on our program. He has given us a very valuable thing here in this box, and inasmuch as quantity always regulates price, I should be pleased to arrange for getting quotations on a large quantity of these boxes if there is any chance of the health officers using the same. I do not mean that the State Department of Health would like to commit itself to the point of furnishing these free of charge to the local health officers; but if you decide you can use these profitably in your communities, it is possible that by arranging to have these boxes made in quantity, it is possble that you can get them at much reduced rates.

Is Dr. Willard present. Dr. Willard, of Watertown? (No response).

Is there anybody present who cares to ask Dr. Levy any questions, or to take part in a general discussion?

DR. WATERS — Wouldn't it be a good idea to allow the health officers of the State to report to the Health Commissioner at Albany, say by the first of December, the number of boxes which they could use if the Health Department would take that number into consideration, and see what figures they could get on them?

DR. BULLARD — I think the box idea is a good thing. I was speaking last evening as to what was needed to assist the health officer in his work. Proper facilities for doing the business is right, next an index system and a modern business system cannot get along without these. Now, that box idea is splendid, and I think many of the local boards would be glad to furnish the health officer with sufficient funds for the local physicians to get them.

I think it would be a good thing for the State Board, or some one, to furnish them, they to be purchased by the local health officers, to furnish as many as will be exclusively for the use of the health officer himself, and containing all of the various blanks to be used by local boards of health. Local boards of health have their work and their reporting inefficient because of lack of proper stationery and the forms upon which to make them out, and properly transact their business.

One other idea that occurs to me in this direction of reporting communicable diseases is: the people of the State of New York are all getting sharp; they are getting quite well informed in many ways in regard to many of the health laws. They know, for instance, that births and deaths have to be reported, and they are also getting so that they understand that the Health Department approves of or requires treatment of the eyes of newly born infants. If a doctor does not do that now, they ask him why he don't; and it is not so difficult, and I think there is a very small percentage of births and deaths not reported now in the State. But there is no law that requires another person, excepting the physician, to report communicable diseases, with the exception of tuberculosis. Therefore a great many people who have measles, whooping cough and even tonsilitis, are sometimes seen with these troubles, who do not even employ a physician for fear of quarantine which is possible if the case is reported. As much as we feel sometimes that we have all the laws we need now, still I feel we have got to have such legislation as will make it obligatory on householders to report cases of communicable disease.

DR. ——— — The last speaker made one good suggestion in relation to records. It may be I am blessed with a liberal board, for they have never refused any reasonable request of mine. Several years ago I told them I should have some place for filing the records of the Department, and they authorized me to purchase a filing cabinet at an expense of thirty-five dollars which has a glass front, and it holds all my correspondence with the State Department of Health, and all the necessary blanks and books relating to sanitary matters and the monthly bulletin as well. I think instead of asking the State Department for these things, I think if the health officers would have a little more backbone and ask their own boards of supervisors they could get the necessary equipment.

THE CHAIRMAN — Dr. Levy will close the discussion.

DR. LEVY — I have already taken sufficient time, Mr. Chairman and gentlemen.

THE CHAIRMAN — We will now hear from our very efficient Deputy Commissioner of Health of the State of New York, Dr. William A. Howe.

QUARANTINE, ISOLATION AND DISINFECTION

By WILLIAM A. HOWE, M.D.
Deputy State Commissioner of Health

Before presenting the brief paper which I have prepared for your consideration this morning, I hope you will pardon my digression long enough to permit me to express to you the profound pleasure and gratification which I find in being more closely associated with such a powerful body of men and women as the health officers of this great State, men and women who are so freely and unselfishly devoting their time, their energy and their skill to one of the grandest works of mankind — the suppression of disease. To a line of work in which the greatest accomplishments are possible, made so only by personal sacrifices and untiring devotion to this noble cause of humanity. At the same time I want to assure you that my one ambition will be to follow steadfastly in the path of our distinguished Commissioner of Health, whose sympathies have always been so closely in harmony with the health officer, and who has always been so solicitous of his welfare. I want you to know that such influences as it may be my privilege to exert, either officially or personally, will be in but one direction, and with but one purpose, namely to lend a helping hand to every effort having for its purpose the protection of the health of the people of our Empire State. In doing so I only voice the earnest desire of our Commissioner, in urging the active co-operation of every health officer, every physician, every dentist and every health worker of the State, in one common crusade against the prevalence of communicable diseases. To deal with this important question, the suppression of communicable diseases, in a manner commensurate with its gravity, and to hold a restraining hand over contagion and infection, is indeed the most far-reaching problem of present day sanitation. In it we find the greatest possibilities of future accomplishments in saving human life, the most blessed privilege of man to man. While it is not to be expected that we will immediately realize the idealism of total suppression of these diseases, it does seem as if a very material reduction in their frequency and fatality

could and should be accomplished. To do this, however, certain things are absolutely necessary. In the first place, we cannot rightfully hope to suppress communicable diseases until we can succeed in getting them universally reported to the health authorities. This pertains to every contagious and infectious disease, the report of which is required by the State Department of Health. The diseases to be reported have, under the law, been designated by the State Commissioner of Health, as follows:

Anterior poliomyelitis, anthrax, bubonic plague, cancer, cerebrospinal meningitis, cholera, diphtheria, hydrophobia, leprosy, measles, ophthalmia neonatorum, pellegra, pneumonia, scarlet fever, smallpox, tetanus, tuberculosis, typhoid fever, typhus fever, whooping cough and yellow fever.

It should be the moral duty of every person interested in the suppression of these diseases, whether he be physician or layman, health officer, attending physician, or parent, to exert his or her influence to secure the prompt report to the health authorities of every such case coming under his or her observation. When this is done, and when proper reciprocal relationship of mutual helpfulness prevails between the attending physician, the parents and the health officer, then may we hope to get these cases universally reported, and having done so, surround them with the necessary quarantine, isolation, and disinfection so absolutely indispensable for their control or suppression. It is plainly incumbent upon us as health officers and health officials to employ every possible means at our command to accomplish this purpose, a realization of which is the first great step mandatory for the suppression of those diseases which are to-day the greatest menace to public health. And just in proportion as we may be able to increase or perfect the efficiency of notification of communicable diseases, so may we hope to advantageously employ the further remedial agencies of quarantine, isolation and disinfection so indispensable for their control.

To you, my hearers, more than any other people, it must be axiomatic that the successful management of any transmissible disease is dependent, first on its prompt report, second its proper quarantine, third its efficient isolation and lastly, its thorough disinfection.

You will agree with me, I am sure, that were we able to secure the prompt report of every infectious and contagious disease occurring in our midst, and could establish and maintain thereon a suitable quarantine under strict isolation and thorough disinfection, we would soon be able to control the spread of these preventable diseases, and save thousands, yes, millions, of precious lives.

In the matter of quarantine the Commissioner has under consideration the advisability of adopting rather a radical modification of the present plan in vogue throughout the State. It is my purpose to briefly outline this plan to you, after which I trust you will avail yourselves of the opportunity to freely discuss it both pro and con. Instead of having one general class of quarantinable diseases as at present, in which the term quarantine means practically the same in every instance, it has been suggested that we might, with advantage, have one class of diseases for an absolute quarantine, another class for a modified quarantine and a third class for an observation quarantine. Then we should have an official quarantine card and an uniform system, which could and would be used in every municipality throughout the State. So far as that is concerned, a similar card and an uniform system might well be used in many States. Personally I can see no reason why diphtheria or any other communicable disease should not be quarantined in the same manner in Massachusetts as in Pennsylvania or in Ohio as in New York, and I can plainly see several good reasons why such an interstate system would be decidedly advantageous in the work of general sanitation throughout the country. The adoption and general employment of such a set of quarantine cards and an uniform system would, in my opinion, not only tend to materially enhance the efficiency of our present methods, but materially strengthen the hand of the local health officer, and relieve him of many of his present troubles, with which you are all so familiar.

In the first class of absolute quarantine should be placed smallpox, scarlet fever, diphtheria, bubonic plague, cholera, typhus and yellow fever, a type of diseases in which the greatest care and the most stringent prophylactic measures are absolutely imperative. With this extreme degree of quarantine, no person, unless per-

mitted by the health authorities, should be allowed to go in or out of the building in which the disease prevails. This ruling should of course not exclude the attending physician, the health officer, the civic officer or the attendant on the sick, whose freedom of movements, however, should be under strict compliance with every precautionary measure. In addition to this prohibition of entrance and exit, an official quarantine card should be posted in a conspicuous place on the building, giving name of the disease within, the degree of quarantine, and the penalty imposed for failure to observe the same. This card, as suggested above, should have the official signature of the State Commissioner of Health and when placed in position, should be dated and signed by the local health officer. Further than this, the municipality enforcing such a quarantine should consider itself responsible for the maintenance of the family so detained, furnishing such necessary food or other supplies, even nurses, when circumstances require it. No article coming in contact with the sick or in any manner exposed to possible infection should be permitted to be taken from the building, until the same has been treated in such manner as may be prescribed by the local health officer to insure absolute safety to those without. This quarantine, as you will observe, is exactly what its name implies, an absolute one, and if religiously employed in the above-mentioned diseases, would, as you can well appreciate, accomplish much toward their extermination.

The second or modified quarantine, like that of the preceding, requires the enforcement of the same precautionary measures, but grants more privileges to members of the family of entrance and exit to and from the building. These privileges, however, must be subject to certain well-defined limitations, as prescribed by the health authorities, any violation of which should be ample justification for the substitution of the absolute quarantine. Here, as before, the official card must be posted, the patient and attendant carefully isolated and all articles leaving the sick room undergo satisfactory disinfection. In case the wage-earner or other member of such a household remain entirely away from the sick room, the attendant or other sources of possible infection, he may be permitted to go to and from his work, but in doing so the utmost care must be exercised, especially with those people whose vocation brings them in close contact with others who might be highly sus-

ceptible to the disease under quarantine. Generally speaking, children are most susceptible to all communicable diseases, and it is their safety which you should guard most vigilantly, not only in matters of modified quarantine, but even more so with that of the absolute form. In the class of modified quarantine should belong such diseases as anterior poliomyelitis, cerebrospinal meningitis, measles and whooping cough.

With the third or observation quarantine, the health officer should be expected and required to maintain such vigilance of the sanitary management of the case as may, in his judgment, be necessary to safeguard the health of the well. He should never be unmindful of the fact that his sphere is purely that of the sanitarian, the promoter of health, and not that of the diagnostician or the physician. In his real capacity he can be of invaluable assistance to the attending physician and of inestimable protection to the family and the community. The diseases which might well be placed under this degree of quarantine are tuberculosis, typhoid and malarial fever, cancer, ophthalmia neonatorum, pneumonia, hydrophobia, tetanus and pellagra, an intelligent observation of which would, as you know, accomplish most brilliant results. In this class of quarantine I would not at present deem it advisable to attempt to placard the house, being content to have such diseases fully reported to the Health Officer, that he might exercise a vigilant observation over their sanitary management.

It matters not what the disease may be, or the degree of quarantine to be maintained, you, as health officers, must always be conscious of the fact that the burden of responsibility rests on your shoulders. This need not necessarily mean that you should bear the full burden of such duties. On the contrary, it is far preferable that you should share such responsibilities with the attending physician. In every instance let him understand that you look to him for assistance and that he may expect the same favor at your hands. Impress him with the idea that such success as you may attain in the case belongs equally as much to him as to you. Make him feel that you are in the case only in an official capacity, and that for the protection of the health of the people. Let him feel privileged to make your position plain to the family, that they may fully appreciate your combined skill and energy are being utilized for their care and protection. With such mutual co-opera-

tion between health officer, attending physician and family, the highest possible efficiency should be accomplished, not only in matters of quarantine, but in general sanitation, and as health officers that should be your constant endeavor.

ISOLATION

Isolation bears somewhat the same relation to quarantine that the latter does to notification, in that one is essential to the other and both are absolutely necessary for the success of either. While notification is a prerequisite to quarantine, isolation is indispensable to quarantine. These three terms are bound inseparably together, being integral parts of the same chain of preventive measures, which are indispensable for the suppression of communicable diseases. To weaken one weakens the others and endangers the success of the whole plan of prophylactic management. With isolation as with quarantine it should be a matter of degree. Not the same stringent measures are necessary for all communicable diseases, and as with quarantine, even far better results will often be accomplished by enforcing just such a degree of isolation as may be required to insure perfect safety to others, and only such. A needless confinement usually tends to engender resistance and disobedience on the part of the patient and family, and they should be made to fully understand that they are being given all the freedom of liberty which the disease will permit in safety to their friends and the unaffected ones.

The degree of success with which you meet in maintaining the proper isolation of the patient, will depend largely on the extent to which you can gain his co-operation and that of the family. This is particularly so among the mild diseases, in which both patient and family are far too often unappreciative of the actual dangers surrounding the case. With all communicable diseases the family must be made to fully appreciate the gravity of the situation. They must be made to realize not only their own danger, but the calamity which they might bring to others, were they to disregard the explicit mandates of sanitary isolation. Their position to themselves and to the public should be made one of education. They should be taught its full significance and made to understand what their strict compliance thereto means, not only to their

family but to their friends and to the whole community. Much of this educational work is plainly within the province of the health officer and no one better than he is able to carry it on as it should be done, and on him the responsibility naturally falls.

DISINFECTION

In some respects proper disinfection is even of greater necessity and value in the suppression of communicable diseases than any of the preceding measures. It matters not how early such an infectious disease may be reported to the health authorities or how perfect its quarantine and isolation may be, it still remains a menace to public health until its ejected poison is thoroughly disinfected or destroyed. You can no more rightfully expect to suppress communicable diseases without effectual disinfection, than to establish a quarantine without notification. It is indeed absolutely impossible and impracticable. You can never feel justified in promising protection to an afflicted family or to a community, until you are convinced of the efficiency and thoroughness of the disinfection which has been employed during and after the prevalence of the infectious disease. It really lies at the very foundation of the whole system of prophylactic measures applicable to the suppression of preventable diseases, and should receive the personal consideration of the health officer in its application thereto.

Many of you are, no doubt, familiar from personal experience, with serious consequences which have arisen from ineffective or careless disinfection during or after infectious diseases. How many of you have seen tuberculosis contracted in a house in which a previous patient had either resided or died? How many have seen an outbreak of typhoid fever arise from the hazardous practice of permitting typhoid ejecta to be deposited upon some watershed or accessible to some public water supply, or within the reach of the germ-carrying fly? How many have seen precious lives sacrificed to the infection of diphtheria by utter disregard to the well-known perniciousness of the Klebs-Loefler bacillus? How many have had sad experience with the well-known tenacity of the undiscovered germ of scarlet fever? And yet all of these sad results can and should be largely prevented.

I believe it is within the possible accomplishment of each of you as health officers to inaugurate and enforce such a drastic system

of disinfection during and after the prevalence of infectious diseases in your midst, as to practically preclude the possibility of their further spread. But to do this you must take the matter into your own hands, and either see that the disinfection is properly done, or do it yourself.

I fully appreciate the difficulties which confront you in attempting to give to this matter the time and attention which its importance rightly demands, and yet I know far too well, and so do you, that this line of work, as at present done throughout the State, is one that is most sadly neglected, and often most imperfectly done. I am mindful of the fact that this unfortunate condition prevails, not by any fault of yours, but largely because most of the municipalities of the State either pay their health officers practically nothing for their services, or refuse to provide ways and means by which the right kind of disinfection could be accomplished. Every town, village and city within this great State should not only pay its health officer a salary commensurate with the extent of the services which he renders, but place in his hands every means with which to attain the highest possible degree of efficiency in the detailed administration of his responsible office. It is indeed a sad reflection on the conscience of our people, that so little concern is often manifested in saving human life. It yet remains to be explained why both State and federal appropriations are more liberal for the care and safety of animals, than for the health of their people. In spite of this deplorable condition, however, the combined energies of the medical profession and health officers can save thousands of lives being lost in this State each year from diseases that are known to be preventable.

Is it not within the power of our 1,400 efficient health officers and of the 13,474 intelligent physicians of this State, which is so proud of her empire supremacy, to unite in such a war of extermination on communicable diseases that this appalling death rate may fall to an insignificant number before our combined energies? I firmly believe such is possible and that by the energetic employment of the four cardinal principles of notification, quarantine, isolation and disinfection, we shall at some future day find ourselves masters of the situation.

THE CHAIRMAN — I am sorry I cannot allow any discussion at this time out of justice to the gentlemen who have come here. I will now call on Dr. Hill, of Minnesota, to give us a talk on typhoid fever.

THE CONTROL OF TYPHOID FEVER

By H. W. HILL, M.D.

Director of the Epidemiological Division, Minnesota State Board of Health

The control of typhoid fever depends merely on finding the courses of the stream of human discharges which flow continually into the mouths of the people and then stop that flow. This is the whole secret of the matter. To find the particular stream which is infected in any given case, you must investigate every case of typhoid fever in full as it occurs — not three months later; not just before they take him out and bury him, nor when he has a high fever; but when he comes in first, and is comparatively sane and can tell you about himself and where he has been and what he has done, etc. Sometimes you can get it from the family and particularly from the mother who usually remembers things of that kind. Having that data, you have your basic data, that is, the data which you cannot do without, and which will permit you to proceed further.

Another stage of the investigation is to determine where the possible sources of infection for the particular flow of discharges are or have been. It may be from the sewage of the community, it may be from a carrier, a convalescent or some one just coming down with the disease, and so on.

You must search for a possible infector for the infectees you have, and you must trace the carriage of infection from one to the other. Of course, we know the customary routes are water, milk supply, food, flies, fingers; and you inquire and figure out for each particular outbreak, what the route of the infective material was.

The circulation of normal discharges is a most important thing. Each health officer should know in his own community the principal avenues which the discharges of his own particular public are taking under normal conditions, from their bowel and bladder orifices to their mouths. A moment's consideration will show that such transfers are continuously occurring. An outbreak of typhoid from milk infection does not mean that the particular man who

infected that milk put his discharges into that milk only on that occasion; it simply means that he has been putting them in right along but they had no obvious effect to call attention to them until they became infected with typhoid bacilli and so produced a specific disease.

When in Wisconsin a student who was stacking dishes in an apartment house, produced forty-three cases of typhoid out of the ninety people who were boarding there, it did not merely indicate that that student who was handling the dishes, had put his discharges on those dishes for that one time only. He had unquestionably been doing it right along. Typhoid Mary is not the first or only cook who put her discharges into food. They are doing it all the time; but fortunately the discharges of ordinary cooks are often normal, and do not do much harm; it is only when you introduce into them an abnormal factor — the bacteria of typhoid and dysentery, that the diseases develop and attention is called to them.

The distinction between public and private health to my mind is: The public official should protect public utilities, such as water, milk, food in food stores and in restaurants, hotels, etc., wherever the public go, from contamination with human discharges. Public utilities include the schools and public institutions of every variety in the State — libraries and hospitals, etc.; every place and everything and every person who handles anything which the public uses; that is what I consider to be within the Department of Public Health. Private health belongs largely to the mother. It is for the mother to see that circulation of discharges in the home does not occur. We must have education in the schools, and practically all mothers with children must be trained from the earliest moment to know how to guard against these discharges.

The actual emergency steps to control a typhoid epidemic are to my mind very simple. If the water is infected, disinfect it — boil it or better still, use hypochlorite. If the food is infected, stop the source of infected food supply; if the milk is infected, boil the milk, or, best and simplest of all, and involving least loss, put the particular dairy from which the infection comes into the hands of some other set of people. Milk is practically infected in most instances by some one of those who are handling it.

If you put it in the hands of someone else for the time being, of course, that infection stops. If food is infected, stop the infected food supply. Abolish the fly, if it is responsible. We have had a very widespread outbreak of dysentery and typhoid from flies in Minnesota this year. In the last fifteen months I have seen thirty-six outbreaks of typhoid fever, and a majority of those were during the summer, and due to flies. In every outbreak of summer typhoid, where outdoor closets are used, a question of great importance is to screen the windows, abolish the breeding places of flies, and use plenty of sticky fly paper inside the house. When you cannot abolish the flies, you can abolish or disinfect with lime the material they carry from the closet, and those precautions will stop the fly epidemic. These are immediate emergency steps to take. Then having cut out temporarily the main source of infection, and prevented further spread, sit down at leisure and arrange permanent measures to prevent recurrence. In all outbreaks, direct contact from the patient to those about him is to be considered. You must look to the nurse, who is usually the mother, for from her the infection is passed to herself and to the rest of the family on her fingers. You may try to instruct the mother what to do but there is no absolute cure except to take the mother away, and put the case in charge of a trained nurse, who sometimes proceeds to infect herself and others just the same; then the only thing to do is to take the case to the hospital. I think the English practice of moving typhoid cases to a hospital at the outset is the proper procedure. From 25 to 27 per cent. of our typhoid cases are contracted directly from the case in the bed, the discharges being touched by those handling them and caring for them. When typhoid is introduced into a community often it spreads by the immediate neighbors coming into direct contact with it — visiting, helping to nurse, etc. The direct spread of typhoid fever by direct contact is an extremely realistic matter in the rural districts, and I know of no way to stop it except to take the case away from the house, so that the discharges of the sick will no longer be available for distribution to the mouths of the rest of the family and the neighbors.

The progress of typhoid is instantly stayed "when flies, food and fingers refuse it their aid. Food of course must be interpreted to include water and milk."

I want to speak of several common fallacies regarding typhoid fever. One of the most exasperating things is that to the public mind and too often to the health officer and the physician, as well, typhoid fever means polluted water. Too often they think the first thing to do is to seize upon some well water and send it to the State Board of Health to have it analyzed. We had an instance where in a town of about 2,000 people, 350 cases of typhoid existed. But the first thing and the only thing reported to us was that the health officer was sending in a vinegar jug of water, requesting "Please analyze this water." We asked to know why the water should be analyzed and this elicited a reply stating that the town was full of typhoid. We did not analyze — we had not time to wait for that — we sent a man at once to find out the facts and what to do about them. I want to point out one fallacy which perhaps give rise to this widespread belief that water is almost always a tremendous factor in every typhoid fever outbreak. When water does become infected you are likely to have a large number of cases from it; that is obvious. But the number of times that water becomes infected, as compared with the number of times that milk and flies and fingers cause the disease, is very small. The total cases produced by each of these sources is not an indication of the relative prevalence of each particular source of infection. I hesitate to give any estimates but I should say that possibly not one-tenth of the total instances of infection of typhoid fever — not cases, but instances — are instances of infection by water, i. e., one instance of infection of the water supply of a great city may give rise to 500 to 5,000 cases. One instance of milk infection may give rise to only fifty cases. One instance of finger infection may give rise to only five cases. But there are daily occurring perhaps 100 instances of finger infection to each one of water infection and so on.

Another fallacy is that the analyst can tell all about the epidemic and its control by analyzing the water. There seems to be some sort of fetish worship or voodooism to the public mind, in making an analysis.

The public imagine that if someone in a far-off laboratory who never heard of their community before only analyzes the water their troubles are at an end. They see no sequence, they ask no

questions — they blindly demand an analysis and rest content. One would think an analysis was a kind of charm.

Another fallacy rather of the health officer than of the public consists in considering the *date of report* of a typhoid case as of some importance. I have seen tabulations and deductions made from them based upon the *date of the report.* I have seen summer typhoid regarded as autumn because they did not think of when it was infected, but when it was reported, which is usually about three or four weeks after infection. Typhoid reports are usually made at least a month after the infection occurred. That is a fallacy so obvious that I am ashamed to refer to it, yet I know it is often disregarded and this is done in serious articles — even in annual reports.

Again, we find physicians who think that the severity of the case has some meaning with regard to the epidemic, I have had physicians say, "Yes, I have had so many cases and this one died, and this one had hemorrhages, etc., etc." I say, "What about the mild cases? Did you report such and such a case?" They say, "No, that was so slight I did not report it."

Usually a physician will not talk patiently with the investigator about the epidemiological features of his cases — he wants to tell all about the pulse, the temperature, the diet, etc. If we could get physicians to realize that they should report all cases even when mild, we have done well.

Constant confusion is found in the mind of the public and also the physician and the health officer between the primary cases of typhoid fever, which alone indicate the source of the general outbreak, and the secondary cases, which come from the primary, and have no bearing on the primary source which started the epidemic. Almost always some of the cases in every outbreak are really imported cases. The investigator, after getting all the cases on his records, should carefully eliminate imported cases and secondary cases before feeling that the real field of investigation for the primary source is laid bare. One of these instances of confusion of imported cases with native cases occurs in Mr. Whipple's book on typhoid fever where Duluth, Minn., is quoted as having a high typhoid death rate and the deduction is made that it must therefore have a bad water supply. Yet almost every death from typhoid in Duluth is due to imported cases from the Iron Range.

Another fallacy is that cases reported indicate cases occurring. Every health officer knows this is not correct. It is usually safe, except in Richmond, Va., to double the number reported, in order to find the number of cases which really exist. Dr. Levy, Health Officer of Richmond, is exceptional in securing the theoretical returns which he should get. Few cities can boast such complete returns.

Another fallacy is this — that the extent of the infection of persons is limited to the extent of the development of cases. As a matter of fact, ten cases does not mean ten infected, but it means about one hundred infected. We had an instance where a population of 10,000 possessed an artesian water of the finest kind for water supply, and yet so arranged that when the river rose the sewage backed up into the water supply. Now of the population of 10,000 we know that 6,000 drank it while the sewage was in it because that number were sick with acute diarrhea. Yet only 500 cases of typhoid developed. There were as a matter of fact, 6,000 people infected but only 8 per cent. came down with typhoid. Remember then that your cases do not represent the extent of the infection, and probably do not represent more than five to ten per cent. of the total infection.

Another fallacy is that ice is a factor in typhoid fever infection. Speaking of that subject in New York yesterday I told them my belief that natural ice is practically never a factor in the sense that water is, i. e., through carrying the typhoid bacilli in the ice from the source where it is derived. I think ice may occasionally be a factor in that it is taken as an excuse to wash hands in the drinking water when people fill the tank with ice, using bare hands to carry the ice, and if they have typhoid bacilli on their hands, they may put it in the water.

Dr. Levy of Richmond has informed me of a case in his experience where a man dropped ice into the drinking water with his hands and as usual the man had bowel and bladder discharges on his hands; unfortunately his bladder and bowel discharges contained typhoid bacilli also and they went in with the ice into the water. The man happened to be in the early stages of typhoid fever at the time.

There is just one other point I want to bring up here: it is usual to quote for the eastern States a typhoid fatality of ten to fifteen per cent. Our fatality — not the death rate, but the number of deaths in proportion to cases in Minnesota, is about 4 per cent., as far as we can find out. I would like to have an explanation as to this enormous difference of rate between the fatality here and in Minnesota. The fatality which Dr. Levy quotes is a little over seven per cent. for Richmond, and it is just the fatality we had in Mankato — and did not represent our average fatality. It was an outbreak.

FRIDAY, NOVEMBER 18, 2 P. M.

SIXTH SESSION

Presiding — Dr. HILLS COLE.

THE CHAIRMAN — The session will please come to order. It is now quarter past two o'clock and it has been suggested that we take the next two papers first, and then have discussion upon those portions of the morning program which were unfinished, as well as upon the two papers which we will now read, so we shall be sure to get the papers before us, anyway, and then allow ample time for the discussion. Would that meet with the approval of those present, or would discussion of the morning papers be preferred?

VOICES — Read the papers.

THE CHAIRMAN — That is well. We will take up the papers. I have looked forward to the day when I could hear a paper on the next subject read before a meeting of this character. I think it is one of the questions we must take up in the immediate future. I do not believe the Empire State can move behind any other State in the Union in this matter, and there are States in the Union which are discussing it and actually handling the topic and the matters related thereto which are to be discussed in the first paper of this afternoon. Some of the best work in this line has been done by the little State of Rhode Island and we have an opportunity this afternoon of hearing Dr. Swarts, Secretary of the State Board of Health, and his views upon certain "Unattacked Communicable Diseases" — I take pleasure in presenting Dr. Swarts.

DR. GARDNER T. SWARTS — Mr. Chairman and sanitary officers, as I was informed by the management of this convention, I am to be allowed fifteen minutes to present my subject. Fearing I would take two and one-half hours if I got interested in the subject, I have arranged to give my address in condensed form, so you will pardon me for reading it.

UNATTACKED COMMUNICABLE DISEASES

By GARDNER T. SWARTS

Secretary R. I. State Board of Health, Providence, R. I.

I wish to express to you my appreciation of the honor conferred upon me in asking the little State of Rhode Island to come to this Empire State, with its large head lines, to speak to you upon a subject as vital to the interests of every State and Nation as it is to our small State. Now we hear a great deal, in these latter strenuous days, of conservation; and while we are paying close attention to the struggle between the conservator of forests and lands, and his superior officer, we must not forget the importance of conservation of human life for which boards of health and

their representatives have been appointed; and in the active every day work of your labors in the endeavor to furnish suitable water supplies and to give advice as to the suppression of nuisances, it must not be forgotten that our most successful work in the preservation of life comes from our knowledge of the means of production and spread of that class of diseases which we call communicable.

We know that some of these diseases are communicated by an organism whose life history we can understand; others we know exist only after exposure to a previous case. In such cases as diphtheria, scarlet fever, smallpox and typhoid fever, by our close attention to the manner in which they are spread, by means of isolation, quarantine and by preventing the passing of the secretions and excretions from an affected case to a well one, we are able to check them in a measure.

Smallpox has been brought to a standstill, diphtheria does not spread when under control, and plague, cholera and yellow fever have been banished in certain localities, yet two of the most communicable and preventable diseases have received no attention from health authorities. Knowing the cause of these diseases and being familiar with the means of their spread, no systematized effort has been made to check them as has been done with other diseases which are less perfectly understood.

These two diseases, syphilis and gonorrhea, have existed from earliest history and are causing a vast amount of sickness, misery and death and yet we do not find them classified among those diseases which are even reported to the health authorities, and why? Because, being diseases which are commonly communicated by means of illicit contact, they are placed under the ban of shame and silence.

Knowledge of these diseases only comes to those who must first be afflicted, usually as the result of enforced ignorance of the existence of them and from submission to natural animal passion which is not properly understood, owing to the demands of an established false prudism. Health authorities are ever ready to warn the wayfarer as to the dangers of smallpox, the police are required to punish the offenders who succumb to the passion for drink, the clergyman is ever ready to help those who are down

and out and the instructors in our schools are ever anxious to hold up the dangers arising from the use of alcohol, but who gives a moment's thought as to what course should be taken for those liable to be exposed to gonorrhea which represent 60 per cent. of the adult male population, and to syphilis with its victims to an extent of ten to fifteen per cent. of the population of our large cities, each one of these having become infected and a menace to his neighbor? Dr. Prince A. Morrow estimates that there occur three to four million cases of syphilis annually in this country. What is being done to prevent the occurrence of three to four million more next year except the treatment that each case may possibly have from his physician after he has in his turn already infected others?

If this data is correct, and it is given to us by observers whose standing is vouched for, is it not high time that the appointed conservators of health and life, the health departments, should take immediate steps to utilize every practical means for controlling the spread of these diseases? Shall we wait as we have done in the control of tuberculosis, for social betterment associations to take up the task of improving the health of the people? Already twelve societies scattered throughout the United States have joined hands in a common crusade. This very day in the city of Buffalo another society for the prophylaxis and control of venereal diseases is being organized; and what are you doing about it here in this convention? What is your State Board doing to advise you as to your duties in the matter?

It will be contended that it is an impracticable problem, but have we been permitted to properly study ways and means? If the subject is broached by the layman, a physician, a clergyman or an individual health officer, he is at once condemned as one who is meddling with pitch and who is seeking notoriety, or has some morbid interest at stake. But health boards can properly take up the problem, as it is in the routine of their legitimate and appointed work. But how can they best accomplish it?

First, by a crusade of education at the proper time and place, and with attention to those who are to be instructed. This means a different manner of approach to the subject according to age, sex and social position. While the adult will give interested at-

tention to the subject, they are usually persons who have little need of instruction; some who are not likely to be brought into danger and others because they have passed through the fire and we can teach them nothing. Education, as with all other matters, commences with the child when the mind is receptive for what is clean, honest and true. The knowledge of sex hygiene is the foundation for a future understanding of influences and desires which follow in the development of the animal and this should be properly understood by the pupil without having it appear that he is learning something which is looked upon by his elders as a mysterious, forbidden subject. Already the instructions in the kindergarten grade, in the subject of biology, are unconsciously acting as the foundation of further study on sex hygiene. The young child learns the interesting story of the manner of development of the seed in the ground, the exchange of pollen in the flower, the gradual development of the butterfly; from that to frogs, hens, and eggs, roosters, domestic animals, man and the perpetuation of the species of all living things is but a short step.

Unfortunately in the present curriculum and in the text-book the child loses the sequence. By the time he reaches the age of seven his book on hygiene will inform him of the location and function of his lungs and stomach, but in regard to other important organs he is left to learn from his mischievous companions, in secret and with disastrous results, because you and I are not men enough to protest. Not for one moment would it be considered admissible that these subjects should be projected at the present time into the studies of pupils from five to seventeen, or the period of adolescence. The mischief which we have permitted to generate would only be increased. It should not be possible for such information to be a novelty.

As the matter stands now we must wait until the boy has grown, until he becomes a student, and as a student he will hear and see, perhaps in his fourth year of medical instruction, the serious results of these diseases. But this is too late; seven years before he has learned by bitter experience in one short month, much more than any professor can teach him. During the freshman year is the most critical time in the student life. The first year in college is the easiest for work; the time when he rushes into

exciting entertainment; perhaps drinks his first glass of beer and is led into contact with prostitution and consequent gonorrhea and syphilis. This awakening period, however, is when the most that can be done is a warning or enlightenment on the liability of the contraction of these diseases; how they are spread and their serious consequences. Owing to neglect of previous instruction along these lines only a few, perhaps, will be deterred from sowing their oats.

Some conscientious instructors endeavor to give a frank, brotherly talk to their students in the first lecture that they present to them. A philanthropist has made it possible, through the New York society, to issue to each freshman student in all colleges in this country, a small pamphlet which presents this subject in a practical manner which must appeal to the fair-minded boy. As to the working boy who leaves his preparatory school he truly enters life with a handicap. No interested adviser to warn him; having just reached manhood, suddenly becoming possessed of even a small amount of money as the result of his own labors, he may readily be tempted into channels by his uneducated fellow workmen, thinking that he can thus better assert his manliness. Why should they not also have the assistance of health authorities and philanthropists?

We should naturally assume that the parent was the proper person to instruct his child against all the dangers of life, but how many are there in this audience who would feel competent to present this subject in a proper manner to his own boys, even if he had the temerity to do so? Where are the mothers who do their duty to their daughters in this respect? As the education of the parent has been neglected, who will teach the parent how he may approach his own flesh and blood with this important topic? There are few physicians who are willing to assist, still fewer those who are capable of approaching the subject with tact, but there is an awakening for information on all practical subjects by those societies known as women's clubs and especially mothers' clubs, churchmen's clubs, and labor unions of the better class, who are ready and eager to receive information which will assist them in their betterment and for the protection of their children who are to become husbands and wives.

One might assume that the normal school teacher who is about to be given the responsibility of the care of the youthful mind and character should know what sort of animals she was about to control and at least be prepared to be shocked by immoral proclivities from her charges which may crop out at any time, but an attempt made in the State Normal School of Rhode Island, to give instruction, was met with censure from some of the parents of those would-be-teachers of youth.

As an illustration of how wide-spread is the desire for suggestions as to how this subject may be taught it may be mentioned that following a conference upon this subject in Providence, R. I., a statement was made in "The Purity Advocate" that the State Board of Health of Rhode Island had offered to send circulars on sex hygiene to suitable persons, free, upon application. This resulted in requests from all parts of the Union, England, Hawaii, South Africa and even New York State. Little Rhode Island unfortunately was not prepared to supply other than its own population although it might have been glad to have helped other states which ought to have been capable of caring for their own needs. Other states than Rhode Island are distributing thousands of leaflets and pamphlets of instruction, notably Indiana, California, Ohio, Vermont and Massachusetts. A series of pamphlets are issued by the twelve societies previously mentioned, but probably the best set of these are the ones issued by the American Society of Moral Prophylaxis of New York.*

These pamphlets are prepared under the direction of Dr. Prince A. Morrow who perhaps has given more attention to this crusade and toward the advancement of this subject than any other person in this vicinity. They appeal to the different ages and give specific methods as to how the parent or teacher may handle the question with intelligence and without sensation.

As with the tuberculosis crusade the exhibition method of graphically appealing to the mind has been successfully employed by the State Board of Health of California. State boards of health

* The series include, No. 1, "The Young Man's Problem;" No. 2, "For Teachers;" No. 3, "The Relation of Social Diseases with Marriage and Their Prophylaxis;" No. 4, "The Boy Problem;" No. 5, "How My Uncle, the Doctor, Instructed Me in Matters of Sex;" No. 6, "Health and Hygiene of Sex"—No. 9 East 42d street, New York city.

should be in a position to supply literature, exhibits, lantern slides and selected lectures to local boards of health and should encourage local formation of leagues for the suppression of the "Black Plague," or as the California board prefers "The Red Plague."

The State of Indiana goes further and endeavors to protect its people by laws prohibiting marriage by those who are afflicted with tuberculosis, insanity or syphilis or gonorrhoea. Compliance with this law will of course be avoided, but it at least calls the attention of the contracting parties to the fact that some danger exists to call for the enactment of such stringent regulations.

But the Puritanical moralist will tell us that a man should suffer for his sins, making him responsible for instincts given him by nature and concerning the control of which it is forbidden that he should be enlightened. If we do assume that immoral association must receive punishment, how are we to clear our conscience of the responsibility of allowing the innocent to suffer?

The Committee on Moral Prophylaxis in New York reported that from statistics collected in that city and Baltimore, 10 per cent. of the men who marry, infect their wives. The New York commission found that 30 per cent. of all venereal diseases occurring in their private practice in the city, in women, are communicated to them by their husbands. This is not a tale from the lower classes or from those lacking knowledge of other important matters. "Seventy per cent. of all women who come to the New York Hospitals for treatment of venereal diseases are reputable married women who have been infected by their husbands."

Fear has been expressed that the presentation of these figures to the public gaze would place the marriage contract in the danger zone for nearly all and that marriage would cease. It need not be feared that the works of nature will cease from fear of danger, but it seems eminently proper that protectors of health and life should at least place warning signs at dangerous crossings and permit those who will heed to "Stop, Look and Listen," as they might in the presence of tuberculosis and insanity.

But what of the 30 per cent. of the women who present themselves at the hospitals and who are not married? If it is deemed necessary that they shall suffer, who will assume the responsibility of the evils coming to their offspring? Sixty to eighty per cent.

of the children of syphilitics die before or shortly after birth. Are we to be a party to infanticide even if some of them might later have proved to be undesirables?

As health officers you have been instructed to take cognizance of several communicable diseases, to ascertain their location and to place restrictions upon the spread of these diseases. Thus in New York city there are reported annually 12,500 cases of measles, 11,000 cases of diphtheria and about 9,000 of tuberculosis; in round numbers, 41,500 cases of infectious diseases. During that same period there are treated 243,000 cases of venereal diseases, namely, six times as many as from all other communicable diseases, and for which no effort is made to control the spread of syphilis and gonorrhoea even in a small way. No report of these cases is made, no quarantine, and not even instruction by the health departments as to their communicability.

It is understood that, naturally, not all the deaths occurring from these diseases are recorded as such, the physician being desirous of protecting his patient from publicity. That health boards may know of the prevalence of these diseases in their own locality and where instruction could be utilized to the best advantage, it is necessary that a report be made to the boards of these two communicable diseases of as many cases as possible to one common bureau. While legal requirements would be evaded largely in the beginning, yet as with tuberculosis, the physician would gradually see his way clear to assist rather than to obstruct the efforts. At the present time there is an effort in this line being made in California and Vermont and the Paige bill in the State of New York is towards the same end. A study of the prevalence of this disease can satisfactorily be made in the navy for the shore leave of the naval man is under surveillance and the presence of sickness is disclosed by the patient or discovered by the surgeon on duty for none are allowed to go ashore from many of the ships before they are inspected and found free from venereal disease. In the United States army there were treated during the year 1908, some 11,113 cases of venereal disease in a total of 78,441 men; one out of every seven.

In the navy the number incapacitated, if applied solely to the force afloat, "would render inactive for over a month three bat-

tleships with a complement of 1,000 officers and men each," as stated in the report of Surgeon-General Rixey for 1908. Attention is called to the fact that " the source of supply of our first enlistment recruits are picked men and are recruited mostly from the rural districts and are in point of virtue above the average grades of society."

It is not the duty of the health officer or the enthusiast in this propaganda to assume control of the moral side of this question except so far as an education in the cause and effect of communicability may reach. It would nullify the effect of the work intended to attempt to assume police powers and methods and it is questionable how much control can be obtained over this form of vice by force. Reglementation by segregation and registration have all been tried and have proved failures. Clandestinism and increase of the diseases have resulted under such control.

Licensing of the prostitute is objectionable on account of its being an official sanction of support of a social evil. Inspection gives a false assurance of security, for the most expert physician cannot guarantee the absolute absence of the presence of the gonococcus in every case. A license to-day is void to-morrow because the male prostateur, as he is called by Morrow, is not examined and when inspection of men is even suggested there is immediate opposition although they are the ones who must necessarily be the means of spread from one infected female to the other.

Before closing, permit me to allude to one sanitary phase of the subject. As has been shown in the figures presented, it is often the innocent who are the sufferers from the wrongs of others. They are, however, capable of instruction, capable of learning if knowledge is placed before them and they may protect themselves; but who is to speak for the innocent babe who is brought into the world by no volition of its own, but who in being born is infected with gonorrhoeal infection of the eyes, and, from the lack of attention of the midwife, nurse or attending physician, or from ignorance of the mother, is made partially or totally blind, yet with the physical power to go on through a full period of life groping with hands for the pleasurable sensations of the sight of which they have been deprived? Twenty-five per cent. of the children in our blind asylums are blind as the result of ophthalmia

neonatorum, a gonorrheal infection of the eyes. If we have no sympathy with the innocent adult victims, if we have no charity for the immoral profligate, may we not be permitted to offer some assurance of safety to the unborn even if we are obliged to soil our hands, in checking the spread of this one disease in such ways as may lie within our power?

Gentlemen, you have been appointed by the people to protect the health and lives of the men, the wives and the children of your respective localities; are you willing and prepared to execute that duty?

Last evening we listened with a good deal of enthusiasm to a number of stories while we were in a happy frame of mind; now let me add a story which I heard some time ago, apropos of whether children should be instructed in these matters —

A physician interested in these matters in a New England state had occasion to treat a boy for gonorrhoea or rather a couple of boys who were attending school in his neighborhood. He learned from one of the boys that he had been inducted into one of the secret societies of the school; that one of the points of initiation was that he should be "made a man;" and therefore a prostitute was brought into the club house and each one of these candidates were permitted to become infected with gonorrhoea. If it is necessary that boys should go into secret societies and be inducted into them by such methods of initiation, is it not your duty and my duty to instruct the men undertaking the induction into these societies of the existence of these diseases, and to warn them to take care?

THE CHAIRMAN — Within the past month or two you have received from the State Department of Health at Albany certain blanks calling for reports upon cases of epidemic anterior poliomyelitis. We all know that we do not know very much about the epidemiology of that disease at present. We are working, to a certain extent, in the dark. The United States government is doing its share in contributing to existing knowledge on the subject, and its most prominent investigator, I think, is with us this afternoon to tell us of some of his findings in this epidemic disease. I take pleasure in calling to the platform to address you Dr. W. H. Frost, United States Public Health and Marine Hospital Service, Washington, D. C.

EPIDEMIC ANTERIOR POLIOMYELITIS

By Dr. W. H. Frost

United States Public Health and Marine Hospital Service

Epidemic poliomyelitis, which has for many years been recognized at intervals, in circumscribed localities, as a serious problem for the guardians of the public health, has, in the present year, become in the United States one of our national public health problems. It has become so chiefly by reason of its enormously increased prevalence — an increase both in the total number of persons affected and in the area of epidemic prevalence.

Lovett, in a compilation prepared for the Massachusetts State Board of Health, gives the number of cases of poliomyelitis reported in the literature of the world as occurring in epidemics by five-year periods from 1880–1909 as follows:

5-year period	Cases	Epidemics	Average number of cases
1880–1884	23	2	11.5
1885–1889	93	7	13
1890–1894	151	4	38
1895–1899	345	23	15
1900–1904	349	9	39
1905–1909	8,054	25	322

After making all due allowance for the increase due to greater accuracy of diagnosis, it is still clearly evident that there has been an actual, progressive and rapid increase in the occurrence of epidemics of this disease. And, what is of more vital importance to us, of the 8,000 cases reported from 1905–1909 approximately 5,500 have occurred in the United States, practically all within the three years 1907–1908–1909. The cases in 1907 were confined quite definitely to New York city and its vicinity. Epidemics were reported in 1908 from several states; in 1909 from at least four, and in 1910 from at least seventeen states.

The surgeon-general of the Public Health and Marine Hospital Service is endeavoring to collect from the health officials of all the

states reports of the prevalence of the disease in 1910. These reports, known to be fragmentary as yet, indicate approximately 2,500 cases reported from twenty-three states; and additional reports, unofficially received, make it quite certain that 3,000 is a minimum estimate of the cases occurring in the United States during 1910.

These figures, to be sure, are not alarming when compared with the statistics of other infectious diseases; but there are, in the prevalence of epidemic poliomyelitis, certain features which add to the seriousness of the problem. First, its rapidly progressive increase, indicating, so far as predictions are justifiable, that the situation for the ensuing year will be more serious than at present. Again, while the mortality of the disease, averaging perhaps ten of fifteen per cent., is not greater than that of other more widespread infections, the mortality in this case represents but a small part of the suffering and economic loss entailed. A very large percentage of those who escape with their lives are left with a permanent disability of greater or less degree, which often results in a lifetime of dependence on the part of the victim and of distress on the part of his family. Epidemics of other diseases come, go and are forgotten; but epidemics of poliomyelitis leave in their wake cripples who will remain as objects of sympathy, often as objects of charity, to the next generation. Another most serious feature of epidemic poliomyelitis is the mystery which still surrounds its origin and means of dissemination, resulting in a lack of confidence in preventive measures and a magnification in the popular mind of the terrors of the disease.

It is not, however, the seriousness of epidemic poliomyelitis, but its preventability which fastens upon the health officer his responsibility in the matter; the seriousness of the disease only increases the gravity of this responsibility. So long as a disease is known to be irremediable the health officer may stand by and commiserate; if there is reason to suspect that it is preventable, it is his duty to investigate; if it is known to be preventable, he must prevent.

To define the status of the health officer in regard to epidemic poliomyelitis, it will be necessary first to give a brief summary of facts bearing on its preventability.

Laboratory studies, a large and valuable part of which have

been contributed by Flexner and Lewis from the Rockefeller Institute, have demonstrated that the disease is transmissible from human beings to monkeys, and from monkey to monkey; animals other than the monkey have been found insusceptible, except by a few observers who report successful inoculations of rabbits.

It has been demonstrated that the specific causative organism is of minute size, being able to pass through a Berkefeld filter; that it is easily killed by heat, and by comparatively weak disinfectants; that it is very resistant to cold and to drying. In the bodies of infected animals the virus (germ) of the disease has been demonstrated not only in the spinal cord and brain, but in the nasal mucous membrane, the salivary glands, mesenteric glands, and, after subcutaneous inoculation, at the site of inoculation and in the lymph glands receiving the drainage from that area. The cerebrospinal fluid and blood have been found infectious in the early stages of infection.

The most uniformly successful method of inoculating monkeys is by injection of the virus into the central nervous system, but successful inoculations have been made into the peripheral nerves, intravenously, intraperitoneally, and subcutaneously; also, which is of great importance, by introducing the virus into the stomach or intestines, by rubbing it into the scarified mucous membrane of the nose, and, as reported by one observer, by bathing the uninjured nasal mucosa with an emulsion of the virus.

Immunity after an attack of the disease is manifested in monkeys by insusceptibility to re-inoculation. In the blood of both persons and monkeys after recovery from the disease, specific antibodies have been demonstrated, capable of neutralizing in vitro certain amounts of the virus. The efforts to produce an antitoxin of therapeutic value have so far been unsuccessful, as have also the efforts to devise a safe means of protective inoculation or vaccination.

Reviewing briefly the results of laboratory experiments, it is shown that epidemic poliomyelitis is an acute infection due to a specific micro-organism. The demonstration that the secretions of the nose and mouth are infectious even in monkeys inoculated intra-cranially, and the successful inoculation of monkeys through the respiratory and digestive tracts, form a convincing chain of evidence that the disease is transmissible by direct contagion.

Epidemiological studies have, to some extent, confirmed the inference drawn from experimental work, that epidemic poliomyelitis is transferred from person to person by direct contact, and have further indicated the probability of conveyance of the disease by healthy persons. Widely divergent inferences have, however, been drawn from the study of epidemics in different localities.

Wickman stands as the pioneer in the epidemiology of poliomyelitis, having convinced himself, by extensive field studies in Sweden, that the disease is spread by direct contact. Other observers, reporting epidemics, have emphatically stated that there was no evidence of contagion. Such divergences of opinion may be partly explained by differences in the thoroughness of investigation and in the personal equation of the observers. It must be evident, however, to any one studying the reports, that epidemics of poliomyelitis vary greatly in their degree of infectivity and in their apparent relation to contact.

Clinical studies have taught that the disease is protean in its manifestations, often diverging widely from the classical descriptions generally given in text books. This fact is important from an epidemiological standpoint, as it raises, at the very outset, an obstacle alike to investigation and prevention, namely, the difficulty of recognizing the disease. Of extreme importance in this connection is the occurrence of abortive forms of poliomyelitis — cases in which there is no paralysis. The absolute diagnosis of such cases has, in the past, often been impossible. There is, however, reason to hope that diagnostic methods worked out within the last year will aid greatly in their future recognition.

As regards the preventability of poliomyelitis then, the disease is certainly due to a specific micro-organism which can be quite readily destroyed by the usual methods of disinfection. It is, therefore, preventable provided that we can locate the organism accurately and apply the germicides thoroughly. The first problem is to locate the organism in that part of its cycle where it can be most readily destroyed. Our present knowledge indicates that man is the essential host, the breeding place of the organism, and that prevention should consist in the destruction of the organism as it is excreted from the body of the patient. The efficiency of such preventive measures remains, however, to be demonstrated.

While it is, therefore, the duty of every health officer for the present to put into effect the preventive measures already indicated, it is highly important that he should at the same time make diligent investigation to ascertain whatever deficiencies there may be in such methods and to point out the means of supplementing or supplanting them.

Invaluable as laboratory studies have been and will continue to be in formulating knowledge of epidemic diseases, such investigations, often of necessity carried out at a distance from the field, never have given, and perhaps never will give a complete knowledge of the conditions governing the spread of epidemic diseases. First-hand knowledge of attendant conditions, derived from observations in the fields have always been necessary to give a practical solution to the problem of the control of any epidemic disease; and this is especially true in regard to epidemic poliomyelitis, which seems in so many respects to disregard the laws which are supposed to govern epidemics of contagious diseases.

It is of the utmost importance to ascertain the exact prevalence of the disease. To accomplish this it is absolutely essential that the disease be made reportable in all states. The transmissibility of epidemic poliomyelitis has already been sufficiently indicated to justify such a requirement on the ground of protection to the community, and as a means of obtaining accurate statistics the measure is absolutely essential. Laws to this effect have already been made in a number of states, and it is to be hoped that in the coming year all other states will follow their example.

So far the disease has been made reportable chiefly, if not solely, in states where its prevalence has already alarmed the people. Let us hope that other states will not postpone their legislation until such circumstances make it imperative, but will at once enact laws to keep them forewarned and forearmed.

The importance of obtaining reports of all cases of anterior poliomyelitis may be illustrated by a few examples:

1. Our knowledge of its prevalence is at present derived largely from unofficial reports of epidemics. These reports embrace for the most part only outbreaks of sufficient magnitude to have attracted special attention and study, failing very often to take account of scattered, so-called sporadic cases. The result is a failure

to give an accurate idea of the actual prevalence of the disease and, what is perhaps of greater importance, a failure to grasp the connection between seemingly isolated cases and epidemic foci. A case which appears absolutely isolated to the attending physician or even to the local health authorities may be seen by the State health officer — who has before him reports of all cases in the State — to have a definite relation to some epidemic focus.

2. By reports of all cases, the isolated as well as the epidemic, valuable inferences may be drawn as to the influence of many large factors, such as density of population, routes of travel, climatic conditions, drainage, the prevalence of insects, the prevalence of paralysis of animals; all of these being points concerning which the most careful intensive study of epidemic foci alone is apt to give erroneous impressions.

3. Prompt and accurate morbidity reports are obviously necessary as a preliminary to intensive study of cases. An edict making poliomyelitis reportable in Sweden laid the foundation for the epidemiological study of poliomyelitis, making possible the extensive studies of Wickman.

Reports from a large area of country cannot be expected to be accurate in detail. Such reports must necessarily be obtained from hundreds of different observers each introducing an unknown co-efficient of error in his own personal bias. To reduce this error, such extensive reports should be made as simple as possible, embracing only bare facts, in reporting which the chances of error due to faulty observation, carelessness in expression or unwarranted inference are reduced to a minimum. Much will be lacking in these reports, much that is of importance in interpreting the laws of epidemic poliomyelitis; but they will at least have the advantage of being broad and, what is better, of being accurate.

To supplement the extensive knowledge gained by collective reports, it is necessary to have other observations not less accurate but more detailed. These observations must be made by individual intensive studies, in which thoroughness and accuracy must be the first aim, extensiveness of observation secondary. Accuracy in such studies may best be obtained by the employment of specially trained, experienced observers; uniformity by having the men engaged in such work keep in close touch with each other;

extensiveness by having a large number of observers, each of them devoting as much as possible of his time to the work. In some instances the local health officer can best make these studies, especially in small localized outbreaks, having as he does the advantage of local knowledge. In most cases, however, it is better to have the studies undertaken by the State, especially studies of epidemics so large as to require more time than the local health officer can devote, and studies of cases so widely scattered as to be inaccessible to one having local duties to perform. The local health officer can, however, even when he is not the principal in the study, be an invaluable ally, being already possessed of a knowledge of local conditions which a stranger in the community would have difficulty in acquiring without his aid.

Our knowledge of the epidemiology of poliomyelitis is based on the result of comparatively few field studies. Wickman has contributed a careful extensive study of over 1,000 cases occurring in Sweden in 1905–1906, a study which is still unsurpassed in combined extent and thoroughness. The Collective Investigation Committee of the New York Neurological Society made a careful study of the epidemic of about 2,500 cases occurring in and around New York in 1907. The Massachusetts State Board of Health has been actively engaged since 1907 in the study of the disease in that State. Their report for 1909, giving the distribution of cases in the State for three years and the results of the intensive study of 150 cases, is as valuable a contribution as has ever been made to the subject, and serves admirably to illustrate the advantages of combining intensive studies with collective reports. Minnesota has made some excellent studies on similar lines, the results of which have not yet been published in full. Some interesting contributions have also been made from Nebraska and scattered reports of smaller outbreaks from various places. During the present year the collective and intensive studies have been continued in Massachusetts and Minnesota, and similar studies undertaken in Iowa. A number of other States, including Virginia, Pennsylvania, Connecticut and Kansas, and doubtless still others of which I have no knowledge, have undertaken at least collective studies of the disease; while in the District of Columbia a collective study has been undertaken by an organization of the medical profession.

The information gathered from the studies in 1910 will be very valuable, but still not sufficient. Reports are wanted from every State to give a clear idea of the situation and how to control it.

To take up now in detail the objects, methods and difficulties of an intensive study of epidemic poliomyelitis:

The official morbidity reports must first be verified as to accuracy of date and diagnosis. Almost invariably, too, these reports will have to be supplemented by the addition of abortive and suspected cases. It is not even to be expected as yet that official reports will include all the abortive cases of poliomyelitis occurring in a community, although the wide discussion of the subject now taking place, calling attention to the existence of such cases, will undoubtedly result soon in their more general recognition.

Wickman, in reporting his exhaustive studies of epidemic poliomyelitis in Sweden in 1905–1906, first pointed out clearly the occurrence of abortive forms of the infection, and emphasized strongly their frequency and epidemiological importance. He distinguished several types of abortive cases.

1. With symptoms of general infection.
2. With symptoms indicative of meningitis.
3. With hyperesthesia and pain.
4. With gastro-intestinal disturbances.

Cases showing symptoms referable to the central nervous system, such as meningitis, hyperesthesia, disturbances of reflexes, or transitory paresis, are sufficiently distinctive to make a clinical diagnosis possible. Other cases, however, can be diagnosed only by inference, from their relation to typical cases of poliomyelitis, and are almost certain to be overlooked unless this relation is known. The practicing physician is usually unaware of the relation of his cases to cases occurring in the practice of other physicians.

Prompt reporting of all cases to the local health officer will therefore not only help the health officer, but will equally help the practitioner who, by keeping in touch with the health officer and being informed of the relation between cases, may often get a lead on an otherwise impossible diagnosis.

Caverly states that during the epidemic of poliomyelitis observed by him, the prevailing diseases of children were accompanied by unusual nervous symptoms; and similar observations have been

made in other epidemics. It would be of great value to obtain, in each focus of epidemic poliomyelitis, careful information concerning diseases of children diagnosed as influenza, neuritis, muscular rheumatism, "summer complaint," etc. Such information can be obtained only by enlisting the hearty co-operation of practicing physicians.

Very frequently, also, abortive cases of poliomyelitis are so slight as not to have been brought to the attention of any physician. The matter, then, of tracing out abortive cases is always one of difficulty, and there is good reason to believe that, except in very limited epidemic foci, such cases have never been traced with satisfactory thoroughness. A house to house canvass of the town seems the only way to accomplish this end satisfactorily.

After tracing up possible abortive cases of poliomyelitis there remains the even greater difficulty of deciding which of these cases may be safely considered as due to this infection. There is the danger on the one hand of too great conservatism and on the other hand of too great enthusiasm for a convenient diagnosis. On the whole I think it may be safely asserted that the error has generally been on the side of conservatism. In order that the epidemiologist may be able to decide which cases he shall include under the diagnosis of poliomyelitis it is necessary that he should, if possible, be provided with a field laboratory sufficient to enable him to make examinations of blood and cerebrospinal fluid. Examinations of this kind promise to be very helpful to the epidemiologist in the future. Especially in regard to abortive cases it is highly important that the field study be undertaken during the progress of the epidemic or very shortly thereafter, as such mild cases of illness will often have been forgotten alike by physician and family within a few weeks after their occurrence.

It may not be out of place here to call attention to the frequency of abortive as compared with paralytic cases in several different localities.

Of the 1025 cases studied by Wickman in Sweden during 1905, 1906, 157 or a little over 15 per cent. are classed as of the abortive type. The author states, however, that this does not, in his opinion, represent the true proportion of such cases. In three circumscribed epidemic foci, offering favorable opportunities for

tracing all cases, Wickman found 68 paralytic cases and 62 of the abortive type, approximately 48 per cent. of the total. Taking into consideration only those houses in each of which there occurred more than one case, Wickman states that of 404 cases occurring in 156 houses, 211 or 52 per cent. were of the abortive type.

In Massachusetts, in the intensive study of 150 paralytic cases occurring in 142 houses, 49 possible abortive cases were found to have occurred in the same houses, which is 26.6 per cent. of the total.

In a field study in Iowa during the past summer, I investigated 67 houses in which there had been 74 paralytic cases and 44 possible abortive cases, making a total of 118 cases, of which 37 per cent. were possible abortive types. Taking into consideration cases occurring in the same vicinity but not in the same houses with paralytic cases, I collected 83 cases which I suspected to be abortive types of poliomyelitis, as compared with 74 frank cases.

Anderson, in a summary of 86 cases occurring in Polk county, Nevada, in the summer of 1909, states that 40 per cent. of the cases showed no paralysis.

Muller gives an account of an epidemic, evidently poliomyelitis, occurring in the Island of Nauru, in Oceanica in January, 1910. Within two weeks, 700 of the 2,500 inhabitants of the island were attacked by an acute general infection affecting the nervous system, but of these 700, only about 50 showed paralysis after three months.

The occurrence of abortive cases of poliomyelitis is by this time well established, and while conservatism in diagnosis is to be commended, we can no longer make definite and lasting paralysis the criterion for inclusion of cases under the diagnosis of poliomyelitis. Abortive cases may be considered as probably more important than paralytic cases in the epidemiology of this disease, and no intensive study can now claim to be complete without taking such cases into consideration. These cases, in fact, are deserving of special study both by the clinician and the epidemiologist.

The plotting of cases upon a map is a helpful and even necessary procedure. The map should be as nearly as possible accurate, and should be on a generous scale. The cases should be plotted on

this map with care as to location and with an easily comprehended graphic representation of the date as well as the location of each case. Such a map, showing at a glance the grouping of cases with regard to previous cases, as well, as in relation to elevation, drainage, sewage disposal, dirty streets, etc., often shows more at a glance than could be learned from the study of many tabulations.

The map, however, is often misleading unless interpreted in the light of further observations. Epidemiological observations to be reliable must be made by personal canvass of cases. Allowance must be made for a certain amount of error in the information obtained from even the most careful personal canvass. It is the realization of this unavoidable error, which leads those who have tried to get accurate information by this means to distrust the accuracy of compilations made from the scattering observation of many different observers.

In the canvass of cases of poliomyelitis it is necessary to go into the symptomatology of each case with more care than is usually required in the epidemiological study of other infectious diseases. This is necessary because, as already stated, in many cases the diagnosis is doubtful, and clinical study is necessary to give to these cases their proper epidemiological significance. It is desirable also to utilize such an opportunity to collect statistical data as to the symptomatology and utimate effects of epidemic poliomyelitis.

In trying to determine the source of infection in each case, while no possible factor should be overlooked, special attention should be paid to determining contact with previous cases, paralytic or abortive. Even when there has been direct contact with a previous case in the acute stage of the disease, it is not always easy to determine this. Contact with unrecognized abortive cases is still more difficult to determine especially in the case of children, whose playmates are often unknown to parents. In reckoning the chances for contact, account must be taken of neighbors, chance playmates, visitors and schoolmates; also, attendance at schools, Sunday schools and church, public places of business or amusement, railway travel, etc. Add to this the chances of indirect contact through other members of the family, visitors, servants, tradesmen, etc., and the possible avenues of contact become

surprisingly numerous and complex, even for a child kept strictly at home in a small family, comparatively isolated. Complicate all this with confusion of dates, failure to remember visits and visitors, and all the other vagaries of the memory, and it is readily seen that even the most careful investigator must needs be very cautious about asserting that there was no chance of contact infection in any given case.

Considering then the difficulties of tracing contact between cases, the tracing of contact is of more epidemiological value than the failure to trace it. This is especially true as regards many of the epidemics which have been reported after very superficial observation.

On the other hand, in interpreting the finding that a certain percentage of cases have been in contact with previous cases, it is necessary to take into consideration numerous factors, such as the probable number of persons exposed to infection and the proportion of these that develop the disease. For instance, in a small community where there had been say, one case per hundred inhabitants, it would mean very little to find that 20 or 30 per cent. of the patients had been in contact with previous cases. This percentage of traceable contacts would mean a great deal more, however, in a larger community where there had been perhaps only one case to each 10,000 inhabitants.

In the effort to trace out contact between cases one must not lose sight of the numerous other possible factors in the spread of the disease, paying most attention to those factors which seem most probably important, but not forgetting to gather information concerning even the seemingly least important. Factors which must be considered are food and water supply, insects, paralysis of domestic animals, relation to water courses, dust, sewage disposal, general hygienic conditions, previous health, etc.

It is impossible, in this space, to discuss the relation of all these factors to the spread of poliomyelitis. Moreover, their importance is, as yet, largely undetermined. Food and water supplies have quite generally been eliminated as probable sources of general infection; although Wickman cites one group of cases apparently infected by their common milk supply.

Previous health appears to have no appreciable influence in de-

termining infection. The influence of insanitary conditions of life is particularly difficult to determine, as it is usually impossible to make more than a rough estimate of the proportion of people in any community who live under what may be called insanitary conditions.

It would seem that, in general, the disease is more prevalent among those classes of people that live in rather crowded, insanitary surroundings; but the incidence of cases among the lower social strata is not sufficiently disproportionate to justify attaching any great importance to general hygienic conditions as a factor in infection.

The probability of insect transmission of the disease is strongly suggested by several epidemiological facts already established. One of the most striking of these facts is the seasonal incidence of epidemics. In this latitude epidemics occur almost without exception in the warm season, from May to November — the season when insects are most prevalent and most active. It is of interest to note in this connection that the epidemics reported from the southern hemisphere have occurred between January and April, a period corresponding seasonally to our late summer and fall months. Another fact which suggests insect transmission is the geographic distribution of epidemics. Generally speaking, epidemic poliomyelitis is a summer disease of cold countries. In Europe, Norway and Sweden, Holland, Germany and Austria have suffered most; in this country, the states which have suffered most are those included in the northeast quadrant.

A further indication of the probability of insect transmission is the distribution of the disease in relation to density of population. Apparently, density of population bears no constant relation to the prevalence of epidemic poliomyelitis. Wickman noted this in Sweden in 1905, and statistics for the United States, so far as they are available, confirm this observation. Indeed, it has been noted both in Sweden and in the United States that epidemics of poliomyelitis are most severe in small towns and rural communities, the larger cities as a rule suffering less in proportion to population.

Since the first considerable epidemic in this country occurred in and around New York city in the summer of 1907, and epidemics

all over the country have been more common since that time, it is naturally suggested that the disease has spread from New York. Yet, if such is the case, the spread has been remarkably slow, considering the constant communication between New York and other parts of the country; and still more remarkably irregular in its progress. In 1907 the region of greatest prevalence was in and around New York city, extending to Massachusetts. In 1908 there were epidemics in Massachusetts, Minnesota, Wisconsin, Michigan, and at least two small outbreaks in Iowa. In 1909 the epidemics reached their height in Massachusetts, Minnesota and Nebraska. In 1910 the disease has been less prevalent in Massachusetts and Nebraska; but has been epidemic in Iowa, Pennsylvania, District of Columbia, Virginia, Connecticut, and other widely separated states. If the disease has been disseminated from New York along routes of travel, it is hard to understand why it has progressed so irregularly, skipping wide areas of thickly settled country; and why it has spread so slowly, becoming epidemic in the District of Columbia, for example, three years subsequent to the epidemic in New York.

These facts are strongly suggestive of the existence of some as yet unrecognized biologic factor, possibly an insect, whose presence in a community is necessary or at least favorable to the spread of epidemic poliomyelitis.

Considering, on the other hand, the evidence against insect transmission, the most striking is that presented by laboratory experiments already cited, viz., the low degree of infectiousness of the blood; the apparent dissemination of the virus through the body by the lymph stream rather than the blood; the demonstrated infectiousness of the nasal and buccal secretions, the possibility of infecting animals through the normal mucosa of the respiratory and digestive tracts. Epidemiological studies have failed to give evidence of the prevalence of unusual insects or of common insects in unusual numbers in epidemic foci; they have failed to give any evidence of an extrinsic period of incubation; they have failed to show that infection is confined to places rather than persons and have indeed shown the probability of healthy persons acting as carriers of infection. Any insect to merit consideration as an obligatory factor in the transmission of poliomyelitis must be of al-

most worldwide distribution and perennial prevalence, for poliomyelitis has occurred in all latitudes from Australia to Canada; and, while epidemics have been confined almost exclusively to the warm months, cases have been reported in the United States in every month of the year. On the whole, the evidence at present available is against the theory of any insect being a necessary or important factor in the spread of the disease; but on this, as on other points, undoubtedly more evidence is needed — another indication of the necessity of field studies.

As regards the relation of paralytic diseases of animals to epidemic poliomyelitis, it has been noted in connection with a number of epidemics that domestic animals, especially chickens, dogs, horses, hogs, cattle and sheep, were found in the same community to be suffering from paralytic diseases clinically similar to the disease prevailing among human beings. The earliest observation of this kind of which I am aware was recorded by Caverly in his report of an epidemic occurring around Rutland, Vt., in 1894, when he noted paralysis of chickens and dogs. One of these chickens, examined by Dana of New York, showed lesions of the lumbar cord resembling the lesions of acute anterior poliomyelitis, this being the only instance of which I am aware in which such lesions have been found. On the other hand, I have knowledge of a considerable number of paralyzed fowls and other animals having been examined in which no lesions of the central nervous system could be found, and know of several unsuccessful attempts to transmit the paralysis by inoculation to other animals of the same species. While the pathology of the paralytic disease of animals has certainly not been sufficiently studied, the bulk of the evidence available is against the assumption of any close relation between such affections and epidemic poliomyelitis. Numerous attempts have been made to inoculate various animals other than the monkey with human poliomyelitis, but the results have been uniformly negative with the exception of some inoculations of rabbits, already referred to. The evidence in regard to these rabbits cannot be ignored, yet it is not quite convincive, and lacks confirmation.

The reports of paralysis among domestic animals in localities where poliomyelitis is prevalent have certainly been quite striking.

Paralysis among domestic animals is, however, quite common and it may be that the numerous reports of it from such localities are due more to increased interest in the matter than to any unusual prevalence of such diseases among animals. The most careful investigation of this point by the Massachusetts State Board of Health showed that the distribution of paralysis among animals did not correspond to the distribution of human poliomyelitis.

The occurrence of epidemic poliomyelitis in the hot, dry, dusty season has given rise to the surmise that dust may be in some way a factor in the spread of the disease. This surmise has been strengthened by the grouping of cases along dusty thoroughfares, observed in several localities; and by the cessation of several epidemics shortly after the dust has been abated by rainfall or sprinkling of streets.

Other observations in support of the causative relation of dust to epidemic poliomyelitis are, the greater incidence of the disease among children at the age when they are likely to crawl and play in the dust, and the greater incidence among males, who are out of doors in the dust, than among females, who are more intimately exposed to infection through contact with sick persons. It has been suggested in view of the occurrence in horses of a disease resembling poliomyelitis that the infective agent in dust is horse manure. The excessive prevalence of dust has not, however, been found constantly to coincide with the prevalence of poliomyelitis. It is true that the disease is more prevalent in the late summer and fall months; it is also true that dust is generally more prevalent at this season, but the coincidence is not sufficient to establish the relation of cause and effect.

Epidemic poliomyelitis must, in the light of present knowledge, be regarded as probably transmissible by direct contact. Its spread, to be sure, does not exactly follow the routes and the laws which we should expect in the case of a disease transmitted by direct contagion; but it is to be remembered that infection of the human body with any micro-organism is a fairly complex biological phenomenon into which there may enter many factors other than the mere bringing together of the body and the germ.

We must consider, first, that the infecting organism is not an unchanging, fixed quantity, not a definite thing like a stable chem-

ical compound, but a far more complex and probably very variable factor — a living organism, reacting to all kinds of external conditions. Realizing the complexity of conditions in the environment of the organism, together with our inability even to analyze these conditions, much less to appreciate their effect upon an ultramicroscopic body, we should be prepared to find the organism deviating at times from the course which, with our very limited knowledge, we should lay down for it.

Taking up, on the other hand, the factor of susceptibility to the infection of poliomyelitis, we may assume this factor also to be extremely variable. There are some facts which indicate that only a certain proportion, usually a small proportion of persons exposed to the disease are readily susceptible to infection. In general it has been found that only one, or at most, a few of a family have the disease. Assuming that the disease is contagious, the other members have certainly been exposed to infection, and their failure to develop the disease would seem to be due to a lack of susceptibility. Even assuming that the disease is not contagious and that infection is contracted from some other source in the environment, it is certainly probable that in general the members of one family, especially the small children, are likely to be exposed to the same environmental conditions. Whether we regard the disease as contagious or not, the rarity of multiple cases in a family seems best explained by individual variations in susceptibility. The occurrence of abortive cases is also an indication in the same direction.

The conditions constituting susceptibility are of course unknown except in a broad, general sense. Statistics indicate that children are more susceptible than adults; that males, especially in later life, are more susceptible than females; the white races more than the negro. The increased incidence of the disease in the summer months among children, suggests the possible operation of causes similar to those which make diarrheal diseases especially prevalent among children in hot weather.

It has been the object of this paper not to explain the spread of epidemic poliomyelitis, but rather to point out the difficulties in the way of explaining it; to attempt an interpretation of known facts chiefly to show the deficiencies in the facts. If the facts

already ascertained seem contradictory, it is because they are incomplete. What is needed to harmonize the apparent contradiction is more facts. Laboratory workers have contributed a generous share of knowledge concerning this disease, clinicians all over the country are studying it; and every health officer should embrace the opportunity to contribute his share of the facts which shall explain the spread of epidemic poliomyelitis. There is little chance of making a brilliant discovery in this work. If such a discovery remains to be made it will be made by one or at most a very few of the many workers engaged. There is a certainty, however, that every accurate observation, every common sense fact added to the subject, will play its part in solving a problem that has already become very serious and shows no indication of becoming less so.

While a discussion of the prophylaxis of epidemic poliomyelitis is not strictly germane to this paper, a few words on the subject may perhaps not be altogether out of place.

After a careful consideration of the facts of epidemic poliomyelitis as known at present, it seems to me that health authorities are morally bound to put into effect to the best of their ability certain pretty definitely indicated measures for the prevention of the spread of epidemic poliomyelitis — measures similar to those adopted for the control of other diseases accepted as directly contagious. Without attempting to go into detail, these measures may be given as

1. Isolation of the patient, with isolation of the contacts so far as practicable — certainly to the extent of excluding members of the patient's family, from school for at least three weeks.

2. Disinfection of the secretions of the nose and mouth and of the stools and urine. Disinfection of all articles which might have been contaminated by the patient.

3. Fumigation of premises after recovery.

In framing our expectation of results from these measures we must consider several circumstances:

1. The disease is already disseminated over a wide area. Experience with other widespread contagious diseases such as scarlet fever, for the control of which we have to depend solely on isolation and disinfection, has demonstrated that we can hardly expect

to eradicate such a disease by present methods, but that much may be done in the way of limiting its spread.

2. Epidemic poliomyelitis presents unusual difficulties in the recognition of even typical cases in their early stage, and of abortive cases in all stages.

3. It will be difficult to estimate the effect of preventive measures, since the disease often fails to spread in communities where conditions seem most favorable for an epidemic.

The hope is certainly justified, however, that energetic preventive measures will result, if not in an actual immediate reduction in the total number of cases as compared with previous years, at least in a reduction of the number that would have occurred without such measures.

THE CHAIRMAN — Now, gentlemen, we will discuss these series of papers on communicable diseases, and first of all I will call upon Dr. Tuthill, of Penn Yan. (No response.)

Is Dr. Frank S. Overton, of Patchogue, here?

DR. FRANK S. OVERTON — Mr. Chairman, in the closing hours of this Conference we should get impressions of the proper balance of judgment in regard to what we have heard.

Now, we have heard a very long, very varied, very interesting, and very practical program. It has been in two parts, I might say. First, the scientific instruction, academic instruction, which we all need so woefully; and, second, is to tell us practically what to do in cases.

Now, as we go back to our districts, to other doctors and our patients, we want to know the practical things to do and details of how they should be done. There is where we have not had as much instruction as we should have, and through lack of time. Now, of all the papers which have been read, the most practical for us to take home for immediate use was Dr. Howe's paper of this morning, which we did not hear in full, as out of deference to the visiting doctors he contented himself with stating that his paper would be published in the proceedings.

There are one or two things about quarantine and isolation that I would have liked to have had presented strongly. One of them is what we, as health officers, shall do in quarantining and disinfecting? That seems to be our main subject.

Then we have had an interesting paper on reporting diseases. At home at this time I am struggling with an epidemic of mild scarlet fever. Where does this scarlet fever come from? It is generally from unsuspected cases that doctors do not see and that parents do not suspect the disease has its origin. I am asked, "Where are these cases coming from?" If I say, "I do not know," they think I am derelict in my duty, and if I say, "They come from cases we do not know about," they say, "Why don't you know something about it?"

Now, to ferret out these cases is where we should learn something. In diphtheria and scarlet fever, which have been with us since the days of our grandfathers, we should know. There are cases of cold, unsuspected cases of scarlet fever, diphtheria, or pneumonia where we can accomplish a great deal.

Now, the second point is on the quarantining; and of all things which come home to us people as we go our way, this plan of having three stages or varieties of quarantine, which Dr. Howe spoke of, seems very important.

On Long Island we had talked that over to a certain extent, and I am glad that has been brought to our attention; and I hope that will be put into effect, and that the State will give us cards signed by the State Board of Health, and not leave the burden of quarantine on our shoulders.

Now, as to disinfection: When are you going to fumigate, is the question. If you do not fumigate, they think the health officer is derelict in his duty. Now, when you come to listen to statements of prominent health officers here of large cities, and they say that fumigation is not of much account and not worth doing, when we know that the health officer of the port of New York publicly writes and preaches the futility of fumigation, and then when the State Board of Health sends out pamphlets and tells us to fumigate, where are we at? I think that is an old subject which is ever new, and we should know what to do.

I hope the State Board of Health will tell us.

THE CHAIRMAN — I think that is an extremely valuable point; but I am sure you will excuse me from saying anything about it, as I am not particularly responsible for that department of the work of the State Department of Health.

Now, is there any discussion of Dr. Hill's paper? We have yet to hear, in this connection, from Dr. Joseph Roby, assistant commissioner of health of the city of Rochester.

DR. JOSEPH ROBY, Assistant Commissioner of Health, Rochester — I have to apologize, Mr. Chairman and gentlemen, for my voice, as I have a bad cold and do not speak well anyway. Apparently it is a difference of opinion that makes horseracing, as Mark Twain said, and I will say the same here, as I disagree with some of the statements made about typhoid this morning. Dr. Hill said he thought as a rule it was four weeks before we became cognizant of the fact that typhoid was existing. I think it may be four weeks, but often and usually it is less than four weeks. I believe the period of incubation in the milk epidemic is about two weeks, and of water it is much less than two weeks. I think it can be cut down to one week. I think many of our men make a diagnosis in from three to four days; so that brings it down to much less than four weeks.

The next point was that he said ten per cent. of the instances of typhoid was due to water. I think that would have to be modified to suit locality. If it is meant that in Rochester, for example, that out of 100 cases of typhoid fever, that 96 of them are due to water, one of them to flies, and one to milk, and one to contact, and one to oysters, I would agree, if you bunched the whole hundred and called it five, that would be about right, that out of five, one would be due to water. But in Niagara Falls and Buffalo, where there is constant affection by bad water, you will find very much more than 10 per cent. is due to water.

For the last two years we have tried to trace the origin of typhoid in Rochester. Of course it would be better if we could trace all of them, but I think the most common means of affection in different localities should be traced, and we should really do that in all parts of the State — every health officer should try to trace every single case he can find time for.

The common means of infection have been supposed to be water, milk, more or less direct contact with previous cases, flies, shellfish and raw vegetables. The Washington report laid more stress on contact and milk. I do not believe, in Rochester, milk has played much of a part, and it is here where the importance of tracing all cases in each particular locality comes in. In Washington it may be of importance to pasteurize all the milk. In Rochester it would not be so necessary, for heating the milk and sterilizing all the bottles and utensils is the only way to prevent an epidemic. All that I need to say is if you have a dairy which is deriving milk from one or five or six farms, and any bad typhoid carrier comes along on any particular morning when they are short of a man, and they hire that man and he goes on and mixes up possibly 5,000 or 6,000 quarts of milk, I think by that you would get widespread milk epidemic in that case, and I do not think anything but pasteurization could prevent it. If you do not think that is liable

to happen, then the pasteurization falls. I have heard in some cases that they prevented milk epidemic. To my mind nothing could be more absurd, as the damage was done two or three weeks before they got on to the job.

In Rochester, little of the typhoid has been due to milk, shellfish, etc Most of it has been from a wife taking care of her husband and children in the family. We have all been accustomed to charging up a certain number of cases to typhoid infection. Although the task seems colossal, I think there should be a clearing-house, so that when Rochester reports a case, there should be an examination to see whether the case was affected in Buffalo or whether it is chargeable back to Rochester.

There are only a few points that I should like to make in this discussion. For two years now I have been trying to trace the origin of cases of typhoid in Rochester. Of course, these results could be much surer were they controlled by laboratory tests of all reported and suspicious cases. But even as it is, I think this tracing of clinical cases should be done in order to determine the most common means of infection of the different localities. Perhaps the commoner means have been supposed to be water, milk, more or less direct contact with a previous case, flies, shellfish and raw vegetables.

I believe that there will be no absolute control of typhoid until all sewage is practically sterile before being poured into lake or stream, and that every drop of water is safeguarded by efficient filtration or carefully patroling the watersheds.

I believe that all cities where there are two supplies, one for domestic purpose and one for fire purpose, should see to it that the two supplies cannot possibly be mixed.

THE CHAIRMAN — We will now call on Dr. Goler to say a few words.

DR. G. W. GOLER, Rochester — *Mr. Chairman and Fellow Trouble-Makers:* Last night there was a meeting in the city of Rochester of the Conference of Charities and Corrections of the State of New York, and at that meeting Dr. William M. Pultney read a paper " For the Prevention and Control of the Social Evil." In that he said that boards of health ignore the problem; that boards of health fear the problem, as by attacking it, they may jeopardize themselves with the public.

As I listened to the papers this afternoon and the discussion which followed, I was reminded of a story. A man whose acquaintance I am privileged to enjoy, and who is a master of some fourteen or fifteen languages, has in his large private library a replica of the Moabite stone, and he has a child of whom he is fond and he has taught that child the Hebrew inscription upon the Moabite stone. One morning while she was walking about the university grounds the little girl met the university president. The president said to the little girl, " Good morning, Dagma, I suppose your father teaches you Hebrew?" The little girl replied, " Yes; I used to read the Moabite stone, but now I go to kindergarten."

A well-known philologist said to me there was no word in any language which meant for man what the word " virgin " means for woman. I do not know whether that is so or not. I have not taken the pains to verify the statement, but if that is so, haven't we then with our old attitude toward the social evil to get — what Helen Putnam spoke of the other night in Baltimore — to get a new mental attitude toward the social evil and to have a new code of morals that should be the same code for men as that we now make for women?

It has been said by Dr. Swarts in his paper — and I agree with what he has so wisely, and it seems to me, so well said — that we should begin, especially we medical and health men, should begin to teach the parents and children something of the sex question.

Well, where will you begin? Are you going to begin in the public schools? Probably not. If I understood Dr. Swarts, we must begin in the high school, but only twelve per cent. of the children who go into the public schools get to the high schools; what shall we do with the other eighty-eight per cent.?

Shall we begin in the colleges? If we begin in the colleges, less than five per cent. of those who go into the high school get into colleges — so we are practically neglecting about ninety per cent. of our children.

Haven't we got to begin to teach the child something of this question of sex at the very earliest period of its life, at five or six years of age, approximately? Haven't we got to begin to teach our patients, and to teach the men who are teaching their patients, that at an early age when a child begins to ask the question "Where did I come from?" Where do babies come from"—"How did I come into the world"— isn't that the time to satisfy the awakening desire for knowledge on the part of the child?

It seems to me that it can be done, and very readily. I can assume that a mother might say to a child when that question came from the little child — not to tell her the "doctor's satchel" or "the stork," but to tell that child the truth. When that child is undressed, before she puts it to bed, she might take it on her lap and folding it to her breast tell her of the womb in her body and of the egg in that womb, and of the attention given to that egg and the growth of the being in that egg, until finally there comes out from the body of the mother, where she has cherished it and treasured it, the child of her heart, and that that child is then born in pain into this world. That is the story I told my own child. That is the story told to me by a young and good matron many years ago in the seat of a railroad train. She had told the story to her children in that way, and it seems to me the story might be told to other children in a similar manner.

At any rate if the story is not told early enough, if it comes later, then it must be taught to the individual; to the boy, or to the girl, or the young man or young woman, by some chance acquaintance. And when, at the proper age and time, it is told, that time may be almost anywhere; and when we tell them we must depict the dangers of venereal diseases, and we should tell the boys particularly that it is their duty to be chaste, not because the sin will be visited directly upon them, but because it may be visited upon those whom they hold nearest and dearest.

THE CHAIRMAN — In the discussion of the next paper, Dr. Irving Snow, of Buffalo, will say a few words.

DR. IRVING M. SNOW, Buffalo — In contrast with the social evil this subject of the field investigation of anterior poliomyelitis is new. It is the most interesting disease we have to study. It is generally a spinal meningitis, and we have learned from Dr. Thatcher that the disease has now become a scourge. It has started all throughout the country, and it is certainly very prevalent in Western New York. A committee was appointed by the Academy of Medicine and it made an investigation into the subject. The disease was reported as prevalent in Buffalo and throughout New York State — the western part of New York State. Here we have a map of Buffalo: The black pins indicate death and the other pins indicate a case, so that we know how the disease prevails in 1910. The disease commenced in June — two cases in June — and in August we commenced to get them in very fast. In August, September and October, we got a total of fifty-five. We find there are a number of aborted and paralytic cases that get well. On the other hand, two-thirds are permanently paralyzed and eight per cent. die; and if in the State of New York there are 300 or 400 crippled children as a result of this disease it is serious.

Every authority of the last two years who has written on the subject states it is communicable. In one case it affected a cousin who was in a room with another two weeks; and as it is communicable it is certainly preventable. It prevails in epidemics, and then you have some sporadic cases. That is a peripheral case coming from a central focus, usually. But you might find that there is a large center, such as Buffalo, New York or the Adirondacks. That is one of the points set forth by Whitman.

The abortive case is like influenza, but if the patient lies with its head back, with stiffness and rigidity for three or four days, you have a case of neuritis, and such terminate in paralysis of the extremity and they should be reported and quarantined.

Regarding the reporting of cases, I think it should be done by every health officer and I think the physician should take care of his own case and quarantine it. He should report the cases and then the State could send out an examiner.

In regard to New York State, there was an epidemic in Lake Placid, another in Wellsville, and the disease has given us fifty-five reported cases in Buffalo. There is an epidemic in Hamilton county and throughout Ontario, and also in the western part of New York State. There are business relations between these points and many thousands of our people go into Canada during the summer, so we are exposed to great danger of infecting them and they of infecting us. So it is a matter for some central authority to control and communicate with the different States. I think the health officers of the adjoining towns should carefully watch its progress in the affected territory.

Regarding a study of the case, I think the first thing is you should send a qualified investigator to examine reported cases.

DR. COLE — The last speaker made a point deserving of a word of rebuttal. It was said that the State should not send out blanks but investigators. If the State Department could do that, it would be glad to do so; but the State Department has to depend upon certain fixed appropriations, and there is a limit to what we can do from the State Department of Health, and that limit is fixed by the dollar, the almighty dollar. If we have the money to pay for the investigator, it is all well enough; but if we have not, then the investigation must stop where it began. That is why we have to rely upon the long-suffering physician.

DR. SNOW — There should be an appropriation of $15,000 or $20,000 specially devoted to this purpose.

THE CHAIRMAN — We shall be delighted to ASK for it.

THE CHAIRMAN — I see Dr. LeSeur. We should like to have Dr. LeSeur make a few remarks on this subject.

DR. J. W. LESEUR, Batavia — *Mr. Chairman and Members of the Convention:* The hour is late and I have a few serious charges to prefer against the Chairman of this meeting. I do so with a feeling of great responsibility, and still with a feeling that I fail to do my duty to myself and my associates if I fail to do this; and as this is the only time and the only place, and the proper place, that I will have opportunity to do it I shall do it now, after making a few remarks before beginning.

The subject is "The Chairman." I charge the Chairman, first, with all seriousness and sobriety, with having prepared the best program for the State Sanitary Officers' meeting that has been prepared. I ask you, gentlemen, is the Chairman guilty or not guilty? (Cries of "guilty.")

DR. LESEUR (continuing) — I charge him with not only having prepared this program, but on the further ground that it has maintained interest from start to finish, and it has made every member of this convention feel that it was worth while to attend this convention. Gentlemen, is the Chairman guilty or not guilty? (Cries of guilty.")

DR. LESEUR — He stands "guilty," and such punishment as your wisdom shall devise shall be meted out to him in the near future.

I regret that discussion of Dr. Swarts' paper could not follow the delivery of the paper. I regard it as a masterly presentation of a very grave and important subject, and before I forget it I want to add another to the charges against the Chairman of this meeting, as well as those against the Health Commissioner. He has provided for us from the sister States some of the ablest, clearest-thinking, most efficient sanitarians that New York State has ever welcomed to her scientific discussions. Is he guilty or not guilty? (Cries of "guilty.") And in this number I include the secretary of the State Board of Health of Rhode Island, our little sister State, whom we have learned to respect for her efficiency and energy in the work of general sanitation. We have learned from our study of bacteriology that it is not

necessarily the largest body that is the most efficient for either good or harm, and it holds good of States that it does not require a large area in order to produce some efficient men.

The discussion of the topic in hand is one that is approached with hesitation by all of us; and present company excepted, I am led to recall a quotation from a large book which recites a statement from a physician of prominence: "Men love darkness rather than light because their deeds are evil;" and the discussion of this problem of venereal disease and its relation to the general public health is one that, dodge as we may and evade as we will, comes to us with ever increasing force.

The essayist referred to the fact that the son suffered for the sins of the father. That is in line with "The sins of the father are visited upon the children, unto the third and fourth generation;" and nowhere is it more true than in this particular sin. It is particularly true that while all sins may be forgiven, that that applies only to the moral world, for in the physical world the man that sins, suffers. And while it is possible to prevent suffering entailing upon the children, I believe the remedy should be used. But mankind is mostly converted in the spring, backsliding in the summer, sinning in the winter and back again to be converted in the spring. We have, all of us, periods when we resolve to be good, and we decide that the right, proper and dignified thing to do is to be virtuous and true. And then we have periods when we forget all about it, and literally and strictly "we go to the devil."

That is not true of a sanitary convention, but it is true of the general public outside; and that is what makes the general subject so difficult to deal with and so hard of remedy. The difficulty lies in the general proposition, which is the keynote of this convention. Within this small rounded head here to my left, there have lain dormant plans for the development of the best sanitary forces in this Empire State. And fundamentally in the thought of this distinguished teacher has lain the fact which has been emphasized over and over again to-day, namely, "Education." We must be taught, and in this particular subject, in this particular vice, as in others; education of the children as they grow up to maturity must lie at the root of any considerable improvement in this condition. It is well enough, of course, to trim trees after they have grown up — and they do get trimmed beautifully sometimes — men and women alike, by the surgeon, and the doctor and then the undertaker, but that does not give you a shapely, symmetrical tree. As the twig is bent the tree is inclined, and until you learn the importance of disseminating the right kind of knowledge on this important subject, until you meet and plan for the sexual life with the same clearness and definiteness of purpose that you meet an anatomical or physical fact and give the children to understand that the wages of sin are death and that the way of the transgressor is hard; until those facts are wrought into the fiber of the children, and until they learn to hate a mean thing and to despise an ignoble one, until that day arrives you have not settled the question. Godspeed the day when that may be realized in the Empire State.

DR. SWARTS — In connection with this subject, I desire to call attention to the preventive package which has been prepared for use in cases of ophthalmia neonatorum. New York and Rhode Island have had a bit of rivalry in this subject, and we of Rhode Island had our package for prevention of ophthalmia neonatorum sixty days ahead of the time when New York State had its prepared. The solution is placed in every store and dispensary where the diphtheria tubes may be obtained. We have also a series of little pamphlets, numbered 1, 2 and 3; one for boys, another for young women, and another for men, and when any of these go to physicians to be treated for ailments of that kind they hand them this literature. Not much good can be done by telling them what they should have done after they had contracted certain of those diseases; but if you placed in the hands of a young man this little pamphlet you might possibly save the expansion of any disease he has contracted to the other members of his family. It is a little thing, but it is practical.

DR. MAGILL — There has been a question raised in the discussion, and I would like to offer some suggestions. A gentleman here asked what was to be done to quarantine or discover these mild cases of scarlet fever and diphtheria. Our own experience is this: In a State institution we found a continually occurring number of cases of diphtheria, and they were not able to render a permanent bill of health for diphtheria or have not been for a number of months. It invariably happens that when the institution is in such a condition there is no prevention until you undertake a methodical examination of the throat of every person in that institution. We have shown that can be done. We have an orphan asylum just outside of Albany which ran this kind of thing for several months. Finally they appealed to us and we took hold, and in the course of a properly selected quarantine and strict enforcement thereof we succeeded in cleaning up the institution. There were no more diphtheritic germs found in that institution. That was cleaned up last November, and there has been no case since and there was no freedom from it before.

As a matter of expense, the superintendent of that institution told me the entire expense of carrying out our operations did not amount to the cost of caring for the sick in that institution during a period of three months. You will say that these mild cases of diphtheria cannot be controlled outside as they can in institutions, but there are cases where you can catch them, as was done in this school. These are infantile affections, and if you thoroughly inspect every child going into the school, and every person going in there to work you will find it is perfectly practicable to find these mild cases, and when you have once found them, separate them and you are safe. That is what makes you safe, and it only requires an effort and a little energy.

There is another question: A gentleman here from Long Island has asked when you have some noted authority in the State who tells you that disinfection is of no use and the State Department of Health suggests it, recommends it, what shall the health officer do? A similar question came up before. Answering that I would say that I believe in discipline and obedience. If your State Department of Health is your authority, you will take your course of action from it rather than from some extraneous source. If distinguished scientific authorities who do not believe in disinfection are at loggerheads with one of the recommendations of the State Department, I am perfectly certain, and I think we all are, that your Commissioner of Health is seeking the best thing for the health of the people of the State of New York and he will not stick to an old thing, if he has anything better. Until he has something better he will stick to the present method. I shall do so, at any rate, because I am told to do so by the Commissioner.

DR. J. W. KING — As regards the investigation of institutions and the general public, I would like to inquire, have we a legal right, a conferred right to go into a school and subject each and every attendant at that school to a swab culture, and the same question about whether we have a right to go into the homes where such children reside?

I have those things to contend with. I am taking charge of an epidemic of diphtheria now. I know the strain that the health officer works under. I have had the pleasure of being sued for $5,000, and a verdict was brought in of "not guilty;" but, have we that right?

THE CHAIRMAN — Is there any health officer from the floor who will answer that question? If not, Dr. Hill will answer it.

DR. HILL — He certainly has in Minnesota, and it is his duty to do so. He has a right of entry and search anywhere in his jurisdiction.

THE CHAIRMAN — I think that is a rule which holds throughout the United States. You are protecting the public and the individual's rights must be a little circumscribed when the benefit of the public at large is at stake.

Some of the statements made by Dr. Hill had exception taken to them, and I think it is only fair to give the floor to Dr. Hill in order that he may say something in rebuttal.

DR. HILL — I did not hear the objections. What were they?

DR. ROBY — It is very difficult to get into a discussion here.

Perhaps the distinction Dr. Hill made may be true of Minnesota, and the statements made about typhoid favor it. The doctor said, for instance, that ten per cent. was due to water. I said if there were one hundred cases in Rochester and ninety-six were due to water, to group those all under one kind of infection, and one for those due to milk, and one for those to flies, one to oysters, and one to direct contact, then you might say that twenty per cent. were due to water. But that would give a very erroneous impression of the number of cases due to water, if ninety-six per cent. were due to water and four per cent. were due to other means of infection.

Again, you said the period was four weeks before typhoid became known. I think in milk epidemics, and also in some water epidemics, that the period of contamination has been less than ten days and it is possible to make a diagnosis, and many skilled men make them in three or four days.

DR. HILL — As far as Dr. Roby's statement goes as to the definition between cases and instances he is correct. In Mankato we had one instance of infection resulting in five hundred cases. In the last summer we have had twenty instances of fly infection. Say that all the cases in these twenty outbreaks amounted to only five hundred; there are twenty instances of fly infection for one of water infection.

THE CHAIRMAN — Dr. Swarts, have you anything further to say?

DR. SWARTS — No, sir.

THE CHAIRMAN — Dr. Frost?

DR. FROST — Nothing, except to get one thing on record: In a meeting of the investigation of anterior poliomyelitis — you must remember that this investigation is only preliminary to controlling it — we only want to prevent it, and while we still know something about it, we must investigate a good deal more before we can know much about the problem or put in operation preventive measures. The preventive measures we know are briefly: isolation of patients, exclusion of insects, disinfection of all discharges from the patient and fumigation of the premises.

As to the efficiency of these methods we cannot say. They have been put in operation in a few places, but not on a sufficiently large scale for us to know their efficiency. Isolation and quarantine alone in such cases have never eradicated such diseases. Take scarlet fever: we believe it is worth while to quarantine, although we cannot eradicate; while we may not eradicate it by quarantine, we hope to reduce the number of cases.

DR. HILL — I would like to ask Dr. Frost why he omits the precaution of watering the streets? We had a large proportion of the cases on unwatered streets in Winona. They began watering the streets on the fifth of August, and on the twelfth of August the last case appeared. Winona never had another case, although the surrounding country was full of poliomyelitis. That is simply a repetition of the results which were obtained by watering at Euclaire and New Richmond.

DR. ROBY, Rochester — I would like to say a word. As deputy health officer under Dr. Goler, of course, I cannot believe in disinfection, but as a member of the State Department of Health, I must believe in it; but if you carefully disinfect, it can certainly do no harm. It may be right enough to say that burning formaldehyde in one room of a house where there has been scarlet fever and where the child has unrestricted run of the entire house, to say that that will not be efficacious. It could not be expected to be.

THE CHAIRMAN — The State Department of Health is very proud of our traveling tuberculosis exhibit. This exhibit was shown in Washington, and the authorities of the National Tuberculosis Congress granted a medal to the State of New York. Whatever excellence has attended this exhibition has been largely due to the painstaking work done on it by Mr. Fetherolf, and I take great pleasure in calling on Mr. Fetherolf to present his paper "The Tuberculosis Campaign as Conducted by the State Department of Health."

THE TUBERCULOSIS CAMPAIGN

By Mr. Charles W. Fetherolf
New York State Department of Health

Our civilization is not yet sufficiently removed from the age of the stone axe and the bronze spear to permit us to forget that our primitive ancestors owed their very existence to the ability to have and to hold food.

For centuries before modern inventive genius produced the gang plow, and reaper and binder, locomotive and steamship, humans had more than passing acquaintance with the gaunt spectre of starvation. The slaying of wild animals; the ability to domesticate animals; the capacity to grow, harvest and store, meant life. For hundreds of years the prevention of death from disease had small consideration compared to the prevention of death from starvation.

The famines of India, Russia and Ireland in recent years create but a faint picture of the extent and horror of a famine such as existed, for instance, in Egypt during biblical times when speedy succor from more favored quarters could not be given because transportation facilities had not been developed.

Perhaps it is this primitive fear of want, transmitted down through the ages, that fastened upon us the spirit of industrialism and commercialism — a love of gain that nurtures selfishness and lust for property — holding to such a degree that examples of men risking and losing their life to gain, maintain or regain physical property, are common.

So to-day we find our Nation, our State, counties and cities keenly bent on the preservation of property. An examination of governmental expenditures will reveal that for every one dollar spent directly to preserve human life we are spending hundreds for the prevention of disease in cattle and plants; the conservation of forests; the digging of canals; the construction of good roads and the maintenance of fire and police protection.

But we are on the threshold of a new era — the era of the Man. Thanks to Loewenhock, Cohn, Lister, Pasteur, Koch, Jenner and

others, an amazing field of possibilities for the conservation of human life has spread out before us. We are turning from the grosser to the finer things of life. We are coming to an appreciation of the fact that "Health is the first wealth."

In this evolution the combat of tuberculosis will be recorded by historians as the first great milestone in popular sanitary progress. It is the first instance in the history of the world when the people of all nations, in all quarters of the globe, have rallied to a universal standard and united in international bonds for the purpose of ridding the earth of a disease enemy.

Other conflicts will be waged for public health, but this great crusade against tuberculosis will have paved the way, and it seems providential that the mode of warfare that must be adopted against tuberculosis should also be warfare against all that tends to foster a low stratum of society.

The victories over smallpox, bubonic plague and yellow fever have been the victories of the medical profession, and the public had small part in the winning of them. But in the fight against the tubercle bacillus a larger force must enlist. We must have the physicians; we must have public officials, clergymen, business men, teachers, farmers, mechanics, laborers, housewives and children. We must have all of them, and the great weapon of all must be knowledge.

The struggle against tuberculosis must be a struggle against the sweat-shop, crowded tenements, long working hours, small wages and against everything that tends to reduce one whit the sum total of human happiness. Therefore, the fight against tuberculosis means progress, for progress is truly measured by the increase of human happiness.

The discovery of the tubercle bacillus by Koch in 1882, having demonstrated the communicability and preventability of the most prevalent and greatest death-producing disease, does it not seem strange that almost nothing was done for twenty-five years to take advantage of the knowledge? There was dense apathy on the part of the people because in their ignorance they continued to look on the consumptive as the product of heredity and a person who had urgent need to put temporal affairs in order and pay close attention to the spiritual.

The campaign against tuberculosis is a campaign for popular education that must reach all. Official action is urgent, but it awaits its master — the public.

Methods vary in various countries and states, in carrying on the fight. Some states, notably Pennsylvania, have adopted the policy of making institutional effort a state effort. The Keystone State in one year appropriated several million dollars for the inauguration of a chain of state hospitals, sanatoria and dispensaries — the latter to be located by counties.

In New York State the policy adopted places the burden of institutional effort on the community, and the Legislature in annual bursts of generosity has appropriated the princely sums of from $7,500 to $10,000 to educate the people of the communities as to their responsibilities in this matter.

Progress during the three years these imposing appropriations have been made, has been greatly accelerated by considerable financial aid from the Russell Sage Foundation, capably administered through the State Charities Aid Association. This Association has worked hand in hand with the State Department of Health in carrying on the State campaign, which does not embrace the confines of the city of New York.

We have found in this work of educating the people that they are a great deal like a certain Swede, in that they require a severe "jolt" to make them sit up and take notice that there is such a disease as tuberculosis. The Swede that I am referring to had been haled before a corner's jury to tell about a railroad fatality. He was told to tell in his own way just how his friend came to his death. He said:

" Val, Olie and me bane valking on the tracks and when I hear a whistle I yust step off de track. Purty soon a train go by. Wal, I go back and walk on the tracks, but when I speak to Oley, Oley don't answer. I look around but Oley not in sight. By'm by I come to Oley's hat laying by the tracks. Pretty soon I come to wan of Oley's arms by the tracks, and then I come by wan of Oley's legs, and by'm by I see Oley's head laying by the tracks, and then by yimminy, I yust make up my mind dat something must have happened to Oley."

So in the campaign against tuberculosis, we are trying to make

the people realize that for centuries something has been happening to them.

The municipal campaign is a strenuous affair. Months before the prospective campaign begins representatives of the State Department of Health and the State Charities Aid Association visit the city and confer with about a score of the leading citizens for the purpose of securing a formal request that the city be given a campaign. The local board of health is asked to appropriate about $200 to defray the cost of purely local publicity. About two weeks before the campaign begins a staff representing the two agencies goes to the city and puts through a program of advertising designed to make the tuberculosis campaign the sole subject of public interest.

The fraternal and benevolent societies are circularized; the clergymen are interviewed and asked to deliver a sermon on tuberculosis on the Sunday preceding the opening of the campaign. In some cases they dispense with the regular evening service and hold a joint union meeting on tuberculosis at which Catholic, Protestant and Hebrew clergymen deliver addresses. Every worker in factory or shop receives a card in the pay envelope calling attention to the meeting. The store windows contain cards advertising meetings and the exceptional privilege of placing posters in the street car windows is secured. Columns of press notices are furnished the newspapers and huge banners emblazoned with the international emblem of the fight against tuberculosis — the double Red Cross — span the principal streets; the motion picture shows display slides advertising the exhibition, a week before the campaign begins.

A program of meetings is arranged. There are meetings for school children to be held at the exhibition during school hours and the children are marched there by their teachers. There are usually meetings for the labor organizations; for the fraternal and benevolent societies; for the women's clubs, and in case of a large foreign speaking population, meetings are held in the mother tongue; meetings with addresses and lectures in French, German, Italian, Polish, Sweedish and Albanian languages have been held. In a city where there is a United States Army Post an entire regiment of infantry was marched to the exhibit, accompanied by the regimental band.

For the purpose of displaying the large traveling tuberculosis exhibition of the State Department of Health and seating the people who attend the meetings, the largest and most central hall available is secured. This is usually the State Armory with its immense drill hall. The exhibition being disposed about the walls of the hall, seats are placed on the floor; the stereopticon lantern is provided, and campaign actually begins.

At each meeting there is a presiding officer, prominent business man, clergyman or lawyer to give an address and a prominent local doctor to give a lecture with a stereopticon lantern. These lectures are accompanied by slides comprising the standard lecture of the Department on Tuberculosis and the doctor is provided some days in advance with a booklet in which the slides are pictured in a logical order accompanied by suitable text.

At each meeting the people are urged to keep in mind the big mass meeting with which the campaign will culminate and the preparations that are made for this meeting are, to say the least, bizarre and unconventional.

Prominent speakers have been secured from out of town; the daily newspapers give whole pages of display advertising for the meeting; the telephone companies on the day of the meeting call up all subscribers and remind them of the meeting. The people are told to listen at 7:30 o'clock in the evening, for at that time the final invitation to attend the meeting is given by the blowing of all the whistles of factories and locomotives and the ringing of the church bells for three minutes.

And then, forth comes the city band or a mass band, and for half an hour before the meeting opens parades the principal streets in the presence of a big transparency with the words "Come with us to the tuberculosis meeting" — and they do come to the meeting, which is usually held in the biggest theatre in the city. Generally the seating capacity is packed to the limit, and hundreds crowd the aisles and available floor space.

Enthusiasm has been aroused to the highest pitch, and then before the effect of the campaign begins to subside there is organized a permanent local committee to continue the good work so auspiciously started. This committee is affiliated with the tuberculosis committee of the State Charities Aid Association. This Asso-

ciation, in turn, is the New York State Branch of the National Association for the Study and Prevention of Tuberculosis, which, in turn, has international affiliations.

With this local committee organized and in good running order the real struggle begins — the struggle to secure local preventive measures, including a county tuberculosis hospital, a county laboratory, a municipal dispensary, a tuberculosis visiting nurse, a thorough compliance with the law relating to registration of cases and disinfection after removal or death, and medical inspection of school children.

Oftentimes the influence of one city, even though it is the principal place in the county, is not equal to the task of securing action from the Board of Supervisors. There are outlying villages, hamlets, and rural districts whose representation in the Board of Supervisors is slow to perceive the necessity of county action.

In order to create in this large constituency a demand for a county institution, the State campaign has been made to embrace in its propaganda a series of campaigns in the villages and hamlets of those sixteen counties in which there seems to be the best prospects of securing favorable action.

Six small exhibits in charge of paid demonstrators will visit nearly two hundred places, and an important duty of these demonstrators is to secure petitions from as many citizens as possible asking the Board of Supervisors to provide a county tuberculosis hospital. In nearly every county in this list the exhibits will be installed in the rooms in which the supervisors meet, and the supervisors are prevailed upon to make the subject of tuberculosis a special order for a certain day.

Now as to results.

It is still too early to expect any marked reduction in the mortality of tuberculosis as shown by statistics, although I have no doubt there has in reality been a pronounced decrease. I think that for a number of years the actual decrease of deaths from tuberculosis will not show in statistics because the physicians will report deaths from tuberculosis more truthfully.

Three years ago there was not a county tuberculosis hospital in the State; to-day such hospitals are in actual operation in four counties and four others have authorized their construction.

Three years ago there was scarcely a city in the State, excepting the metropolis, that had a tuberculosis hospital dispensary or a tuberculosis visiting nurse. To-day there are five cities having a nurse, free dispensary and hospital. Twelve have two of the above named agencies, and eight have at least one of the preventive measures in force.

Three years ago there were not more than two local committees for the prevention of tuberculosis; to-day there are seventy-three such committees scattered about the State.

During the three years the State campaign has been in operation, progressive laws have been enacted in behalf of the effort to stamp out tuberculosis, and all indications point to a glorious fulfillment of the prophecy, "No uncared for tuberculosis in New York in 1915."

THE CHAIRMAN — If there is nothing else to come before the Conference, a motion to adjourn is in order.

(Motion made, stated, seconded and carried.)

Conference adjourned sine die.

HEALTH OFFICERS AND DELEGATES IN ATTENDANCE AT CONFERENCE

ALBANY COUNTY

Dr. J. R. Davidson, South Bethlehem.
C. W. Fetherolf, Albany.
Thomas E. Finegan, Albany.
Theodore Horton, Albany.
Dr. Wm. A. Howe, Albany.
Dr. F. H. Hurst, Guilderland Center.
Dr. Chas. P. McCabe, Greenville.
Dr. W. S. Magill, Albany.
Dr. Albert Mott, Cohoes.
Alec H. Seymour, Albany.

ALLEGANY COUNTY

Dr. A. T. Bacon, Canaseraga.
Dr. C. R. Bowen, Almond.
Dr. Geo. E. Burdick, Alfred.
Dr. W. O. Congdon, Cuba.
Dr. H. E. Cooley, Angelica.
Dr. Jasper W. Coller, Wellsville.
Dr. Geo. Hackett, Ceres.
Dr. W. J. Hardy, Belmont.
Dr. Charles F. Hoffman, Bolivar.
Dr. F. E. Howard, Friendship.
Dr. H. L. Hulett, Allentown.
Dr. C. W. O'Donnell, Andover.
Dr. F. L. Redmond, Fillmore.
Dr. Geo. W. Roos, Wellsville.
Dr. Edith W. Stewart, Hume.
Dr. Wm. S. Todd, Belfast.

BROOME COUNTY

Dr. Dan S. Burr, Binghamton.
Dr. F. McLean, Chenango Forks.
Dr. W. H. Wilson, Lestershire.

CATTARAUGUS COUNTY

Dr. E. L. Fish, Ashford.
Dr. S. Z. Fisher, Randolph.
Dr. William Follett, Sandusky.
Dr. W. F. Gardner, Conewango.
Dr. H. W. Hammond, Ischua.
Dr. John C. Hoeffler, Salamanca.
Dr. Charles Kelley, Franklinville.
Dr. Frederick Krehbiel, Delevan.
Dr. A. D. Lake, Gowanda.
Dr. S. B. McClure, Allegany.
Dr. W. E. MacDuffie, Olean.
Dr. E. M. Shaffner, Salamanca.
Dr. Geo. R. Turk, Little Valley.

CAYUGA COUNTY

Dr. N. B. Ford, Owasco.
Dr. R. R. McCully, Union Springs.
Dr. Francis W. St. John, Weedsport.
Dr. W. A. Strohmenger, Moravia.
Dr. S. N. Thomas, Moravia.
Dr. J. H. Witbeck, Cayuga.

CHAUTAUQUA COUNTY

Dr. A. J. Bennett, Jamestown.
Dr. A. E. Dean, Brocton.
Dr. G. E. Ellis, Dunkirk.
Dr. Guy Granger, Sherman.
Dr. L. C. Green, Panama.
Dr. Vernon M. Griswold, Fredonia.
F. P. Hall, Jamestown.
Dr. Wm. A. Putnam, Forestville.
Dr. D. S. MacNee, Ripley.
Dr. John J. Mahoney, Jamestown.
Dr. Edgar Rood, Westfield.
Dr. O. C. Shaw, Cassadaga.
Dr. Walter Stuart, Westfield.
Dr. A. D. Young, Mayville.

CHEMUNG COUNTY

Dr. F. B. Parke, Elmira.
Dr. A. M. Loope, Wellsburg.

CHENANGO COUNTY

Dr. Paul B. Brooks, Norwich.
Dr. A. R. Morse, Oxford.
Dr. James B. Noyes, New Berlin.

CLINTON COUNTY

Dr. Gilbert Dare, Schuyler Falls.
Dr. F. M. Swift, Plattsburg.

COLUMBIA COUNTY

William E. Carney, Philmont.
Dr. Franklin D. Clum, Cheviot.
Ambrose Lasher, Germantown.
Dr. Louis Van Hoesen, Hudson.

CORTLAND COUNTY

Dr. George D. Bradford, Homer.
Dr. F. H. Forshee, McGrawville.
Dr. H. F. Van Hoesen, Truxton.

DELAWARE COUNTY

Dr. C. S. Allaben, Margaretville.
Dr. F. E. Balt, East Meredith.
Dr. Robert Brittain, Downsville.
Dr. Gilbert T. Scott, Davenport.

DUTCHESS COUNTY

Dr. John N. Boyce, Stanfordville.
Dr. C. L. Fletcher, Dover Plains.
Dr. Edward J. Hall, Mooers Mills.
Dr. Frederick J. Mann, Poughkeepsie.
Dr. John S. Wilson, Poughkeepsie.

ERIE COUNTY

Dr. W. H. Baker, Williamsville.
P. M. Blake, Buffalo.
Dr. C. E. Bowman, Alden.
Wm. B. Brenner, Buffalo.
Joseph H. Carley, Buffalo.
Dr. Edward Clark, Buffalo.
Dr. John T. Claris, Buffalo.
J. J. Coughlin, Buffalo.
Dr. E. A. Dean, Lackawanna.
Dr. Homer E. Dyke, Buffalo.
Dr. Francis E. Fronczak, Buffalo.
Dr. Arthur R. Gibson, Buffalo.
Geo. H. Gorman, Buffalo.
Mr. John D. Goshleski, Buffalo.
Dr. Franklin C. Gram, Buffalo.
Mr. William J. Hanley, Buffalo.
Dr. F. A. Helwig, Akron.
Dr. T. H. Johnston, Farnham.
Dr. W. B. Jolls, Orchard Park.
F. H. Klecke, Buffalo.
Dr. Henry C. Lapp, Clarence.
Dr. Garra K. Lester, Blasdell.
Dr. J. G. Levy, Buffalo.
Dr. L. B. Longee, Marilla.
Dr. P. A. McCrea, West Falls.
Dr. J. D. MacPherson, Akron.
Dr. William B. May, Buffalo.
Dr. Burt J. Maycock, Buffalo.
Dr. Charles S. Meahl, Buffalo.
Jos. C. O'Gorman, Buffalo.
Frank Recke, Jr., Buffalo.
Dr. Ralph Robinson, Lackawanna.
Dr. Alfred Regan, Buffalo.
Walter L. Ruth, Buffalo.
Dr. Arthur C. Schaefer, Buffalo.
Dr. M. B. Shaw, Eden.
Mr. Frank B. Smering, Buffalo.
Dr. Irving M. Snow, Buffalo.
Dr. F. H. Stanbro, Springville.
Col. F. G. Ward, Buffalo
Dr. Walden M. Ward, North Collins.
William H. White, Buffalo.
Dr. F. B. Willard, Buffalo.
Dr. J. D. Wooster, Wales Center.
R. S. Woodburn, Buffalo.

ESSEX COUNTY

Dr. F. M. Noble, Bloomingdale.

FRANKLIN COUNTY

Dr. W. H. Harwood, Chasm Falls, Malone.
Dr. A. L. Rust, Brushton.
Dr. W. A. Wardner, St. Regis Falls.
Dr. C. F. Wicker, Saranac Lake.

FULTON COUNTY

Dr. John Edwards, Gloversville.
J. Frank Titcomb, Gloversville.

GENESEE COUNTY

Dr. R. M. Andrews, Bergen.
Dr. John W. Baker, Batavia.
Dr. Henry E. Ganiard, LeRoy.
Dr. Charles D. Graney, LeRoy.
Dr. E. E. Hummel, Darien Center.
Dr. J. W. LeSeur, Batavia.
Dr. M. P. Messinger, Oakfield.
Dr. E. C. Richardson, E. Pembroke.
Dr. Elliott C. Smith, Corfu.
Dr. Ward B. Whitcomb, Batavia.

GREENE COUNTY

Dr. George Haner, Tannersville.
Dr. Robert Selden, Catskill.

Dr. William A. Wassen, Greenville.
Dr. Charles E. Willard, Catskill.

HAMILTON COUNTY

Dr. John P. Brannen, Long Lake.
Amos Hough, Long Lake.
Walter D. Jennings, Long Lake.
Dr. Fred Stevenson, Indian Lake.

HERKIMER COUNTY

Dr. Charles H. Glidden, Little Falls.
Dr. F. J. Harter, Herkimer.
Dr. Cyrus Kay, Herkimer.

JEFFERSON COUNTY

Dr. C. F. Adams, Carthage.
Dr. Francis W. Bruce, Carthage.
Dr. J. D. Cole, Alexandria Bay.
Dr. Eugene M. Crabb, Cape Vincent.
Dr. John T. Fowkes, LaFargeville.
Dr. H. J. Frame, Clayton.
Dr. J. E. Jones, Evans Mills.
Dr. A. L. Morgan, Dexter.
Dr. E. A. Simonds, Carthage.
Dr. Frank M. Vebber, Clayton
Dr. E. S. Willard, Watertown

LEWIS COUNTY

Dr. F. E. Jones, Beaver Falls.
Dr. H. A. Pawling, Lowville.
Dr. I. H. von Zierolshofen, Croghan.

LIVINGSTON COUNTY

Dr. J. H. Burke, Dansville.
Dr. C. J. Carrick, Nunda.
Dr. H. B. Marvin, Lima.
Dr. R. A. Page, Geneseo.
Dr. Arthur P. Reed, Geneseo.

MADISON COUNTY

Dr. R. H. Ash, Canastota.
Dr. R. L. Crockett, Oneida.
Dr. H. S. Gardiner, Hamilton.
Dr. J. W. Knapp, Canastota.
Dr. Geo. F. Mills, Oneida.
Dr. A. R. Thomas, West Eaton.
Dr. Geo. W. Willcox, Hamilton.

MONROE COUNTY

Dr. J. M. Allen, East Rochester.
Dr. W. W. Belcher, Rochester.
Dr. P. D. Carpenter, Pittsford.
Dr. John L. Hazen, Brockport.
Dr. S. G. Hermance, Clarkson.
Dr. Chas. W. Hennington, Rochester.
Dr. M. E. Leary, Rochester.
Dr. Horace J. Mann, Brockport.
Dr. D. G. Mason, Henrietta.
Dr. J. Pease, Hamlin.
Dr. Joseph Roby, Rochester.
Dr. William Stanton, Webster.
Dr. E. H. Vail, Churchville.

MONTGOMERY COUNTY

M. Jennings, Amsterdam.
Dr. James S. Walton, Amsterdam.
Dr. C. C. Vedder, St. Johnsville.
Dr. William Zoller, Fort Plain.

NASSAU COUNTY

Dr. J. A. Hutchinson, E. Rockaway.
Dr. H. G. Wahlig, Sea Cliff.

NEW YORK

Prof. Charles Baskerville, New York.
Dr. Hills Cole, New York.
Dr. John B. Huber, New York.
Dr. John B. Garrison, New York.
Dr. E. H. Porter, New York.
C. Christian Sofleiss, New York.

NIAGARA COUNTY

Dr. F. W. Bentley, N. Tonawanda.
Dr. Frank T. Carmer, Newfane.
C. F. Crofur, Lockport.
Dr. J. E. Helwig, Martinsville.
Dr. John C. Plain, Ransomville.
Dr. F. A. Watters, Lockport.
Dr. Edwin Shoemaker, Newfane.
Dr. H. A. Wilmot, Middleport.

ONEIDA COUNTY

Dr. Arthur P. Clark, New Hartford.
Dr. G. W. Fisher, Utica.
Dr. G. C. Lyons, Camden.
Dr. G. W. Miles, Oneida.
Dr. Wm. D. Peckham, Utica.
Dr. Otto Pfaff, Oneida.
Dr. G. J. Pollard, Oriskany Falls.
Dr. W. C. Rosen, Boonville.

ONONDAGA COUNTY

Dr. W. D. Alsever, Syracuse.
Dr. J. W. Brower, Mottville.
Dr. Frank R. Coe, Warner.
Dr. S. Ellis Crane, Onondaga Valley.
Dr. C. H. Graves, Delphi Falls.
Dr. A. B. Rood, Manlius.
Dr. B. W. Sherwood, Syracuse.
Dr. D. M. Totman, Syracuse.
Dr. R. A. Whitney, Liverpool.
Dr. J. R. Young, Liverpool.

ONTARIO COUNTY

Dr. L. P. Conley, Clifton Springs.
Dr. O. J. Hallenbeck, Canandaigua.
Dr. B. T. McDowell, South Bristol.
Hon. Chas F. Milliken, Canadaigua.
Dr. F. H. Newland, Clifton Springs.
Dr. W. A. White, Phelps.

ORANGE COUNTY

Dr. Palmer R. Bowdish, Cornwall.
Dr. F. E. Gessner, Port Jervis.
Dr. J. C. Hanmer, Middletown.
Dr. W. H. Snyder, Newburgh.
Dr. Ira C. Whitehead, Walden.

ORLEANS COUNTY

Dr. John Dagan, Albion.
Dr. David E. Fraser, Lyndonville.
Dr. Frank H. Latin, Albion.
Dr. Leon G. Ogden, Albion.
Dr. Geo. F. Rogan, Medina.
Dr. George Strasenburgh, Kendall.
Dr. John H. Taylor, Holley.

OSWEGO COUNTY

Dr. W. G. Babcock, Cleveland.
Dr. E. W. Crispell, Williamston.
Dr. E. J. Cusack, Fulton.
Dr. E. J. Drury, Phœnix.
Dr. F. E. MacCallum, Pulaski.
Dr. C. W. Radway, Mexico.
Dr. Robt. Simpson, Fulton.

OTSEGO COUNTY

Dr. H. V. Frink, Richfield Springs.

PUTNAM COUNTY

Dr. J. C. Slawson, Mahopac.

RENSSELAER COUNTY

Dr. E. E. Finch, East Greenbush.
Dr. Geo. R. Little, Schaghticoke.

ROCKLAND COUNTY

Dr. L. B. Couch, Nyack.
Dr. Ralph DeBaun, Congers.

ST. LAWRENCE COUNTY

Dr. James W. Aitchison, Madrid.
Dr. H. T. Carter, Piercefield.
Dr. F. E. Graves, Morristown.
Dr. D. M. Taylor, Edwards.
Dr. Frank F. Williams, Canton.

SARATOGA COUNTY

Dr. T. E. Bullard, Schuylerville.
Dr. M. M. Dolan, South Glens Falls.
Dr. D. C. Moriarta, Saratoga Springs.
Dr. J. P. O'Keefe, Schuylerville.
Dr. Charles S. Prest, Waterford.
Dr. Frank J. Sherman, Ballston Spa.
Dr. J. Seward White, S. Glens Falls.
Dr. Wm. Van Doren, Mechanicville.

SCHENECTADY COUNTY

Dr. Charles F. Clowe, Schenectady.
Hon. Charles C. Duryee, Schenectady.
Dr. C. W. Ensign, Rotterdam Jct.
Dr. William L. Wilson, Scotia.

SCHOHARIE COUNTY

Dr. Chas. K. Frazier, Cobleskill.

SCHUYLER COUNTY

Dr. S. B. Allen, Burdett.

SENECA COUNTY

Dr. W. W. Carleton, Waterloo.
Dr. D. F. Everts, Romulus.
Dr. A. J. Frantz, Seneca Falls.
Dr. A. Letellier, Seneca Falls.
Dr. W. M. Stacey, Waterloo.
Dr. F. W. Severn, Interlaken.

STEUBEN COUNTY

Dr. P. L. Alden, Hammondsport.
Dr. S. H. Bennett, Greenwood.
Dr. H. S. Gillette, Savona.
Dr. Chas. O. Green, Hornell.

Dr. D. P. Mathewson, Bath.
Dr. J. B. Murritt, Prattsburg.
Dr. Geo. M. Peabody, Wayland.
Dr. G. L. Preston, Canisteo.
Dr. W. W. Smith, Avoca.
Dr. F. L. Spaulding, Cohocton.
Dr. F. S. Swain, Corning.
Dr. James F. Trant, Prattsburg.

SUFFOLK COUNTY

Dr. Wm. A. Baker, Islip.
Dr. Wm. B. Gibson, Huntington.
Dr. Hugh Halsey, Southampton.
Dr. Frank Overton, Patchogue.
Dr. Guy H. Turrell, Smithtown.

SULLIVAN COUNTY

Dr. G. H. Lathrop, Livingston Manor.
Dr. Frank I. Smith, Barryville.

TIOGA COUNTY

Dr. W. L. Ayer, Owego.
Dr. G. S. Carpenter, Waverly.
Dr. C. W. Chidester, Newark Valley.
Dr. M. B. Dean, Candor.
Dr. R. D. Eastman, Berkshire.
Dr. R. H. Fisher, Spencer.

TOMPKINS COUNTY

Dr. J. F. W. Allen, Ithaca.
Dr. H. H. Crum, Ithaca.
Dr. Wilbur G. Fish, Ludlowville.
Dr. C. H. Gallagher, Slaterville Springs.

ULSTER COUNTY

Dr. J. W. Bowman, Wallkill.

WARREN COUNTY

Dr. G. H. Aldrich, Stony Creek.
Dr. Floyd Palmer, Glens Falls.

WASHINGTON COUNTY

Dr. R. A. Heenan, Hudson Falls.
Dr. Robt. H. Lee, South Hartford.
Dr. D. C. McKenzie, Granville.
Dr. G. M. Stillman, Argyle.
Dr. A. M. Young, Salem.

WAYNE COUNTY

Dr. J. S. Brandt, Ontario.
Dr. W. J. Hennessy, Palmyra.
Dr. G. A. Jones, Wolcott.
Dr. Robert Morris, Lincoln.
Dr. F. L. Willson, Sodus Point.
Dr. Geo. D. Winchell, Rose.
Dr. A. A. Young, Newark.

WESTCHESTER COUNTY

Dr. W. J. Carpenter, Katonah.
Dr. E. H. Codding, New Rochelle.
Dr. W. S. Coons, Yonkers.
Dr. G. P. M. Curry, Mt. Kisco.
Dr. John L. Hughes, Mt. Vernon.
Robert Haviland, Chappaqua.
Dr. P. H. Mason, Peekskill.
Dr. H. F. Patch, Chappaqua.
Dr. Leon E. Peeler, Harrison.
Dr. Edwin G. Ramsdell, White Plains.

WYOMING COUNTY

Dr. Lemar M. Andrews, Warsaw.
Dr. E. B. Belknap, Wyoming.
Dr. J. R. Brownell, Perry.
Dr. W. O. Burbank, Pavilion.
Dr. W. J. French, Pike.
Dr. W. B. Gifford, Attica.
Dr. P. S. Goodwin, Perry.
Dr. W. N. Martin, Cowlesville.
Dr. L. E. Stage, Bliss.
Dr. Z. G. Truesdell, Warsaw.

YATES COUNTY

Dr. William H. Hawley, Dundee.

REGISTERED VISITORS IN ATTENDANCE AT CONFERENCE

ALBANY COUNTY
Mrs. J. R. Davison, S. Bethlehem.

BROOME COUNTY
Mr. A. W. Beilby, Lestershire.
Mrs. F. McLean, Chenango Forks.

CATTARAUGUS COUNTY
Mr. W. O. Curtiss, Olean.
Dr. Geo. F. Reusch, Franklinville.

ERIE COUNTY
Dr. John H. Grant, Buffalo.
Mr. Daniel H. Squire, Buffalo.
Dr. L. M. Waugh, Buffalo.

GREENE COUNTY
Mr. Charles Voss, Tannersville.

MONROE COUNTY
Mrs. A. B. Hermance, Clarkson.
Anabel Hermance, Clarkson.

NASSAU COUNTY
Capt. J. S. Boyce, Lynbrook.

NEW YORK COUNTY
Mr. M. N. Baker, New York.
Mrs. Charles Baskerville, New York.
Capt. G. W. Smith, New York.

ONEIDA COUNTY
Dr. Martin Cavana, Sylvan Beach.

RENSSELAER COUNTY
Mrs. E. E. Finch, East Greenbush.

SARATOGA COUNTY.
Mrs. J. Seward White, S. Glens Falls.

STEUBEN COUNTY
Mr. M. E. Shannon, Bath.

WARREN COUNTY
Mrs. Floyd Palmer, Glens Falls.

WASHINGTON COUNTY
Mr. J. E. Ryan, Hudson Falls.

Dr. John A. Amyot, Toronto, Canada.
Dr. Wm. G. Ebersole, Cleveland, O.
Dr. Allen W. Freeman, Richmond, Va.
Dr. W. H. Frost, Washington, D. C.
Dr. P. M. Hall, Minneapolis, Minn.
Dr. H. W. Hill, Minneapolis, Minn.
Dr. Chas. A. Hodgetts, Ottawa, Can.
Dr. E. C. Levy, Richmond, Va.
Dr. Gardner T. Swarts, Providence, R. I.
Mr. Frank D. Van Da Linda, Boston, Mass.

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